RAILROAD GAZETTE

FRIDAY, JUNE 28.

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Contributions.

The Strong Locomotive.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have been reading with much interest your criticism of the "Supplementary Paper on the Strong Locomotive," read before the American Society of Mechanical Engineers, and Mr. Dean's communication.* It seems to me that Mr. Dean is laboring under a delusion, which is that the common locomotive has been standing still for about 15 years. Mr. Dean is correct if he compares the Strong locomotive with those locomotives used 15 years since, but in nowise so if the comparison is made with the locomotive of to-day. Gradually the American locomotive has been improved, and this improvement has been accompanied by a change, quite considerable, in the steam regulation. This has resulted in a set of designs such that, from locomotives on the main lines of railroads, indicator cards are described, as shown in current issues of the railroad press, which are better than those shown from the Strong locomotive. A far more conclusive argument for Mr. Dean to use would be to accompany his communication by a sample card with all data, and properly authorized, and allow comparisons to be made by the reader directly.

From what has been shown it would look as if the superior qualities of the Strong locomotive result more from its excellent boiler than from its valve gear. Z.

Refrigerator Cars for Fruit.

CHICAGO, June 22, 1889.

TO THE EDITOR OF THE RAILROAD GAZETTE:

My attention has been called to a recent statement in a Southern paper to the effect that fast fruit trains are necessary for the transportation of peaches to the North, for the reason that "refrigeration will not do for peaches;" that after transportation in a cold car they decay very quickly on being taken out. The writer of this statement must be ill-informed on the subject he has tackled. Experience disproves his statement.

Four or five years ago we brought a car load of peaches from Griffin, 45 miles above Atlanta, to Chicago, and also a car to Cincinnati, in excellent shape. I kept some of the peaches from that car in Chicago from Monday to Saturday, and they were eaten at the Grand Pacific Hotel.

Southern fruit business in refrigerator cars fails to make progress because those interested are trying to do it without the proper auxiliary, a *cooling house*, to start with. The year following the shipment referred to above, the Georgia crop was so light that it was not worth while to send cars there for it, and then they put off erecting houses in which to prepare the fruit for shipment until the fruit was ripe. I can refer you to parties who were in Chattanooga and Atlanta two years ago, and shipped peaches by express to Cincinnati, less than 28 hours' run; the fruit did not bring cost price when it reached destination. Thoughtless people associate the old idea of refrigeration with moisture and dampness, something that we have eliminated from the question entirely, by our system of handling fruits. At the Grand Army reunion in Columbus last year, we had on display for a week in the exhibition hall grapes, peaches and pears that had been through our house at Riverside, Cal., and six or seven days in a refrigerator car. The year before, in St. Louis, we carried the San Bernandino exhibit from Riverside, Cal., to St. Louis, and after displaying the fruit in St. Louis five or six days, several crates of grapes, pears, etc., were brought Chicago. We had last July a shipment of apricots here, which was the only shipment of ripe apricots, picked ripe from the tree, that ever reached Chicago. The flavor of the apricot which has matured on the tree is as different from the pale, green, sickly yellow apricot picked hard, decayed enough on the road to be eatable, as can be imagined.

CHAS. F. PIERCE.
Manager Tiffany Refrigerator Car Co.

* The *Railroad Gazette*, May 24 and May 31.

The Renewal of Bridges on the Pennsylvania.

The Pennsylvania Railroad has resumed its full train service, the New York and Chicago limited going on last Monday. For some time after the opening of the road the necessities of the towns along the line compelled the company to give preference to local freight, and the heavy freight movement over the Erie and New York Central continues.

The following notes concerning the damage done and the work on hand will be found of interest:

East of Harrisburg there was no serious damage. At Marysville (west end of the Rockville bridge over the Susquehanna), a stone arch of two spans of 24 ft. each, built on timber foundations, was undermined and the arches fell. A trestle has been built and a new stone bridge is to be erected on rock foundations.

Eight miles east of Mifflin, a 10 ft. stone arch culvert was washed away. It will be replaced as it was before.

At Lewistown, a three-span single track iron Pratt truss was carried away. The spans were 153 ft. each, and the bridge is to be replaced by A. & P. Roberts between now and Aug. 1.

Of the four-span double track bridge at Granville, one span remains, the other three (125 ft. each) are to be replaced by the New Jersey Steel & Iron Co.

The Mayes bridge, five spans of 125 ft. each, double track, was all carried off. Cofrode & Saylor are to build a new one, one track to be done by Aug. 1.

Of the Manayunk bridge, which is 57 ft. high, four of the 125 ft. spans were carried off, one being left. Cofrode & Saylor will build an entire new bridge.

At Vandevers a stone arch bridge of 10 spans, 50 ft. each, was completed last year. The water ran over the top of this bridge, and carried away some of the coping and all of the track, but otherwise did no damage. At the west end of this bridge 500 ft. of embankment 25 ft. high was washed away. One mile further west was a 100-ft. iron bridge over the canal. Here the east abutment was washed away, and the bridge had to be taken down. All of the track was entirely washed away between these two bridges. It will be relaid on the same location.

West of Mill Creek three-quarters of a mile of track was washed off an embankment. Three miles below Mill Creek the tracks and interlocking tower were washed away and the tower has not been found. One mile west of Huntington the canal bank broke and 400 ft. of track was washed away.

Neff's bridge, consisting of 40 ft. iron girder trusses, was carried off, as was bridge No. 7 on the Little Juanita. At bridge No. 13, west of Tyrone, the masonry was undermined.

The three-span plate girder bridge over the Conemaugh at the South Fork Station was carried up stream by the flood. This will be replaced by a three-span stone arch for three tracks, Drake & Stratton being the contractors. This firm will replace the celebrated viaduct built by the state in 1832, one mile below South Fork. This bridge was 80 ft. high; the water came up level with the top and carried every vestige of the bridge away. The new bridge is to be of two spans of 60 ft. each.

One mile west of Mineral Point the channel of the stream was changed when the road was built. Here the flood tore out the track for a half mile, leaving no trace of anything like a railroad.

Bridge No. 6, two miles east of Conemaugh, which was plate girder, three spans, 48 ft. each, has entirely disappeared, masonry and all. It is to be replaced by three 60 ft. stone arches, by Brown, Emery & Co., of Bethlehem, Pa. At Buttermilk Falls the road was washed away for 4,000 ft.

The washing away of the passenger trains and engines at Conemaugh is well known to our readers. There were at this point two main tracks and five side tracks, besides a lot of tracks to the shops. The machine shop was 50 ft. square, the roundhouse had 16 stalls and there was a large coaling station. All these, with the signal tower, were swept away, except a portion of the wall of the turn-table pit.

Between Conemaugh and Johnstown bridge the track was all carried away, but the road-bed was not badly damaged.

On the West Pennsylvania Road one pier and three spans of the bridge at Blairsville were carried off. This was an old wooden bridge consisting of six 125 ft. spans.

At Leechburg a new iron bridge (three spans of 153 ft. each) lies in the river. It will be taken up and replaced.

At East Tunnel a wooden deck bridge (three spans of 145 ft. each) is wholly gone. It will be replaced by an iron bridge. The West Tunnel bridge was considerably damaged.

Philadelphia & Erie Division.—The Montgomery bridge consisted of seven 150 ft. wooden Howe trusses, strengthened with wooden arches. Four spans were carried off. The entire 7 spans will be replaced with iron by A. & P. Roberts. At Williamsport was a Howe truss with arches, 3 spans of 160 ft. each. It is to be rebuilt by the road.

At Linden, 4 miles west of Williamsport, two of the seven spans were carried off. These will be replaced by the company's men. At Keating a Howe truss, 3 spans, 150 ft. each, was carried off, and is to be replaced with iron by the New Jersey Steel & Iron Co. On the Northern Central 10 bridges were lost. They were all through Howe trusses, and from 100 to 160 ft. in length. On the Bedford Division two bridges were lost. One of them was on trestles for repairs at the time of the flood.

The main line is now double track through except on some of the trestles. A pamphlet has been issued giving a popular account of the splendid work done by the company in gathering lumber and other material, in massing its men from the whole system between New York and Chicago and St. Louis, and other measures, by which the road was opened in two weeks after the flood.

The Master Mechanics' Convention.

We give in brief the proceedings of the last day of the Master Mechanics' Convention at Niagara Falls. The papers presented and the discussions of the first two days were reported in our issue of last week.

The President announced the appointment of Messrs. John Hickey, H. Tandy and William Garstang as a committee to report subjects for investigation and discussion at the next annual meeting. Later the committee presented the following subjects:

Compound locomotives, their relative efficiency as compared with the simple engine.

Testing laboratories, chemical and mechanical.

Link, as compared with other valve motions.

Aside from increased grate area, are there any other advantages to be gained by placing fire-boxes above the frames?

Steel vs. iron axles as relates to friction wear of journals and journal bearings and liability to breakage in service.

Brick arches in locomotive fire-boxes.

Locomotive tanks or tenders, best method of preventing corros on in the coal space.

Relative size of cylinder and smoke stack.

The best proportion of steam passages in relation to size of cylinders and steam pressure.

Is it necessary to secure false valve seats to cylinder when balanced valves are used?

Is it advisable under the present state of manufacture to use cast-iron wheels on locomotive engine trucks?

A preliminary vote on the next place of meeting resulted as follows: Chattanooga, 29; Buffalo, 12; Montreal, 8. One of these three places will be selected by the Executive Committee.

The salary of the secretary was fixed at $1,200.

The following officers were elected: R. H. Briggs (Kansas City, Memphis & Birmingham), President; John Mackenzie (New York, Chicago & St. Louis), First Vice-President; Albert Griggs, Providence & Worcester), Second Vice-President; Orlando Stewart (Fitchburg), Treasurer; Angus Sinclair, Secretary.

The following resolution was adopted by a rising vote:

Resolved, That the thanks of this Association be tendered to Mr. J. H. Setchel for the very efficient manner in which he has filled the president's chair, with honor and credit to himself as well as the Association.

A resolution was adopted to appoint a committee to advise the Master Mechanics' Association of the status of the automatic coupler question, and whether they can indorse the M. C. B. Association's action in recommending the vertical type as a standard from a mechanical point of view.

The Car Accountants' Convention.

The fourteenth annual convention of the International Association of Car Accountants convened at Plank's Grand hotel, Mackinac Island, Michigan, on Tuesday, June 25. Representatives from 73 roads were present at the opening session of the convention. A large number of private car companies also have representatives in attendance, making the total number of car service men present upwards of one hundred. The following officers of the association for the ensuing year were chosen by acclamation. President, E. C. Spalding, Western & Atlantic; Vice-President, E. M. Horton, Illinois Central; Treasurer, H. G. Sleight, Terre Haute & Indianapolis; Secretary, H. H. Lyon (formerly Chicago & Alton).

The report of the per diem committee, which strongly indorsed the mixed system on the basis of ½ cent per mile and 10 cents per day, brought out a lengthy discussion and developed the fact that fully one-half of the roads represented prefer a straight per diem system. The convention finally voted to lay the report of the committee on the table until the next annual meeting without action pending the disposition of the question by the General Time Convention.

The second day of the convention was devoted largely to consideration of the demurrage question. Mr. Borner, Western Freight Agent of the Pennsylvania Company, who has had much to do with the organization of the Chicago Car Service Association, was present and explained in detail the methods pursued by that association in collecting demurrage in Chicago. He stated that the system was working to the entire satisfaction of every railroad running into Chicago, and from his intercourse with the various shippers patronizing his lines it was very clear to him that the opposition of shippers to the plan is fast disappearing, and that many of their largest customers were already outspoken in its favor.

Mr. Hequemborg, Superintendent Car Service, Missouri Pacific, explained the methods employed by the Omaha demurrage bureau in collecting data and applying the demurrage charge, which is somewhat different from the course pursued at Chicago. He stated that a bureau was about to be established at St. Louis under the same working plan as that of the Omaha bureau. It was the general opinion of the car accountants present that the Omaha organization was the better of the two. The discussion following by the convention was to the effect that the establishing of demurrage bureaus at principal points would only slightly quicken the general movements of cars, and that before the problem of better car service is solved a universal system of per diem charges to be paid directly by each road will have to be inaugurated. Representatives of Eastern roads complained that the Chicago bureau was of no practical benefit to them in the securing of more prompt return of their cars from that territory, as there still remains no

more incentive for the Western roads to return cars towards home after discharging lading than before the bureau was organized. It was the sense of the convention that a penalty of not less than $1 for each case should be collected from roads diverting foreign cars to transport freight in which the car owner has no interest, and a resolution to this effect was passed to be referred to the General Time Convention for action.

The convention adjourned June 26 to meet in New York either next May or June, as may be decided upon by the Committee of Arrangements.

New Station and Interlocking at the Jersey City Terminus of the Central of New Jersey.

The Central Railroad of New Jersey has just put into operation the extensive interlocking plant erected for it by the Union Switch & Signal Co., at the entrance to its station at Jersey City, N. J. We illustrate herewith the arrangement of tracks, showing the signals and their arrangement, and also give a view of the interior of the train shed, which is notable as having an excellent skylight.

The new station is erected on the site of the old one, and the tracks approaching it have been entirely relaid with 76 lb. rails. The yard has been regraded, the filling being cinders and slag, and has been raised in some places as much as 4 ft. Rock ballast will be put in as soon as the new ground is settled. The train shed is already in use, but the waiting rooms, offices, etc., are not quite finished.

The arrangement of the tracks is very clearly shown in the engraving. The plan is not drawn accurately to scale in all particulars, but the arrangement of the cross-over tracks and switches and the relative position of all important features are correctly shown. The small figures along the upper and lower sides of the drawing give the longitudinal distance in feet between the points of the switches. It will be observed that by the arrangement of the long cross-over track, *S* and the shorter one *N*, every conceivable movement between the station tracks and the main tracks of the main line and the Newark Branch can be made with great facility. Tracks 8 and 10 are used for switching purposes, and signals 11, 12 and 13 are for trains leaving either one of those tracks and moving towards the station. These signals govern switch 29, but not 27. The location of these semaphores is slightly incorrect in the drawing, their position being, like that of the other signals shown on the bridge, at the right of the engineer approaching them. The usual rule of having the upper signal indicate for the right-hand route where two or more arms are placed upon one post, is observed. Signal No. 2 admits to track *S* only. A train proceeding along that track into Nos. 3, 5, 7, etc., has to get another signal (14, 15) before it can proceed beyond switch 39. Signal 3, however, gives a clear road into the train-shed, the track for which it is set being shown by the indicator. Signal 4 gives a clear road on the north cross-over track as far as signal 18, at which point indicators show the route for the remaining distance. Thus the three principal signals just described admit to six, four and five tracks, respectively.

Signals 6, 7 and 8 give similar indications; the other signals, being arranged on the same plan, will be clear to the reader. Although there are 40 switches altogether, there are but 22 levers for them, and these levers also move three movable frogs. There are five movable frogs in the plant, the radius of the slip switches being made quite long (500 ft.) in order to admit of rapid train movements. With a radius of this length ordinary frogs leave a considerable space at the centre unprotected by any guard rail, and they are thus liable to derail trucks which have a short wheel base or are not in the best of order. There are 49 facing-point locks and signals governing 80 routes, making the total number of levers as follows: 22 levers for 40 switches and three movable frogs; one lever for 2 movable frogs; 14 levers for 48 facing-point locks; 29 levers for 40 signals and 40 indicators and one facing-point lock; total, 66 working levers. The heavy coloring at the switches shows their normal position.

There are no distant signals, but the machine has 72 levers, of which two are left spare for the insertion of distant signals for tracks 1 and 4, if it should be desirable. The tower is 15 × 38 ft., and it is manned by three men, two of whom attend to the levers. The lower floor of the tower is sunk about 20 in. below the surface of the ground, and the perpendicular rods and wires from the levers above are joined to the leading-out connections *above* the floor instead of beneath it. In front of the operators in the tower are hung temporary charts, showing in large figures the proper order in which to pull the levers for each movement. The floor on which the operators stand is covered with corrugated rubber, such as is used on car steps, out-door stairs, etc. Inward trains, after discharging their passengers, are "kicked" back by the road engine into track 10, the engine stopping at signal 67. The engine then proceeds on track No. 6 to the engine house. The yard engine distributes the cars from track No. 10 to the sidings leading from track No. 18.

The new station building, or head house, which supersedes some very shabby wooden structures which have been in use ever since the opening of the road to Jersey City in 1864, is of brick, 128 × 215, and three stories high. It has a central tower, with a clock, on the side facing the Hudson River, and there is a magnificent Howard clock, with glass case, facing the train shed. There is a large central hall, or waiting-room, 64 × 96, open to the roof. Surrounding this are the offices, restaurant, etc., on the first floor, and rooms for officers on the second and third. Ornamental iron balconies giving access to the upper stories surround this inner court on three sides. The wainscoting of the interior is of light yellow English glazed brick, with black trimming, and the general appearance is very neat and handsome. The train shed is 215 ft. wide × 512 long, and about 75 ft. high in the centre. The walls are of brick and the roof, as will be seen from the illustration, is of iron and glass. The noticeable characteristic of the train shed is its very light and cheerful appearance, in which respect it is an advance on anything we have seen in this country. The main span of the roof is 144 ft. and the skylight in the centre is 55 by 512. The glass is supported on Helliwell's patent steel bars, with bearings 13 ft. apart. No putty is used. The outer end wall, which does not show to good advantage in the illustration, being so far in the background, is wholly of glass. The Helliwell glass roof, of which Josephus Plenty, of 69 Broadway, New York City, is the agent, has been largely used in England, the Blackburn station of the Lancashire & Yorkshire having 160,000 sq. ft. of it in the roof, and the Brighton station of the London, Brighton & South Coast 107,000. The Hull & Barnsley has a similar roof of 40,000 sq. ft. at Springhead, and a number of other roads have smaller roofs. The Jersey City roof contains 28,000 sq. ft. of glass. Of the 12 tracks in the train shed the six odd numbers are used for inward trains and the six even numbers for outward. The platforms separating each pair of tracks from the neighboring pair are 14 ft. in width and are of the well-known granolithic pavement. They are about 12 in. higher than the rail.

INTERIOR OF TRAIN SHED—CENTRAL RAILROAD OF NEW JERSEY, JERSEY CITY, N. J.

The architects of the station and train house were Peabody & Stearns, of Boston, and the contractors V. J. Hedder & Sons, 18 Cortlandt street, New York. Post & McCord, 102 Broadway, New York, did the iron work, the rolled iron coming from the Phœnix Iron Co. A separate building contains the boilers for heating and the electric light apparatus, which consists of four large Edison dynamos. There are four Babcock & Wilcox boilers. These also furnish steam for heating passenger cars in the yard. The cost of the building, which embraces four new ferry slips, is stated as about $400,000, and the total expenditure $500,000.

American Society of Civil Engineers—Convention of 1889.

The Convention began at Seabright, N. J., Thursday evening, June 20, with a meeting for organization. Mr. J. J. R. Croes was made Chairman of the Convention. Announcement was made of the programme of meetings.

On Friday morning the first paper was that of Mr. Theodore Cooper on

AMERICAN RAILROAD BRIDGES.

The paper is a long and elaborate one, and would fill about six pages of the *Railroad Gazette* without any of the many illustrations which accompany it. It was not read in full.

About one-third of the paper is a brief history of the wooden, iron and combination bridges of the United States, illustrated by examples of several of the early structures.

The first bridge entirely pin connected is thus described:

"In 1858–59, John W. Murphy built for the Lehigh Valley Railroad a Whipple-Murphy bridge of 165 ft. span over the canal at Phillipsburg, N. J. In this bridge he substituted for the cast trunnions on the post feet of the Whipple bridge pins of wrought-iron, unturned. The lower chord was formed of wrought-iron elongated links similar to the Whipple form. The main web bars were wrought-iron bars with looped eyes at each end. The counter bars were also bars with looped eyes, but the lower eye was elongated and fitted with gib castings and keys for tightening the bars. This is the first truss bridge, as far as the author has been able to discover, which was pin connected throughout. In 1869 this bridge was taken down, and put up as the middle span in a long wooden bridge of nine spans, at Towanda, Pa., to reduce the liability of destruction of the whole bridge by a fire. In 1879 it was again removed, and rebuilt by substituting wrought-iron compression members for the cast-iron, turning the pins, reboring the links, etc., and put up at Shepherd's Creek, on the Southern Central Railroad.

"In 1861 Mr. J. H. Linville built a bridge on the Delaware extension of the Pennsylvania Railroad over the Schuylkill River, in which were used for the first time wide forged eye-bars and posts formed of wrought-iron sections.

"The era of long span truss bridges in America may be considered as dating from the building of the first bridge over the Ohio River at Steubenville, between 1863–64, by Mr. J. H. Linville. The channel span was 320 ft. long and 28 ft. deep. The top chord and posts were made of cast-iron. It was proportioned for a rolling load of 3,000 lbs. per foot of track, a notable increase in the load heretofore in use.

"In 1876 the Cincinnati Southern Railroad bridge over the Ohio River was built by the Keystone Bridge Co. under specifications prepared by Mr. G. Bouscaren, the design being made by Mr. J. H. Linville. The channel span was 519 ft., the longest truss span ever built up to that time. The channel spans of the Henderson Bridge, 522 ft., and of the Ohio River Bridge, Kentucky Central Railway, at Cincinnati, 550 ft., are the only independent truss bridges up to the present time with greater spans.

"There are now in existence on American railroads over five miles of bridges with spans from 300 to 400 ft., nearly four miles with spans from 400 to 500 ft., and 2½ miles of bridges with spans exceeding 500 ft., estimated as single track bridges, all exclusive of wire suspension bridges.

"The Erie specifications drawn by the writer in 1878, embodying the results of his experience in the designing of bridges, their shop construction, the testing of material and the study of existing bridges and their defects, was the first general specification covering the designing, proportioning and detail of construction with that completeness necessary to give the railroad company the full advantage of the competitive method, with a certainty that the resulting structure would in all ways be up to the advanced state of the art. It was the first paper on bridge construction in which that relic of ignorance, 'the factor of safety,' was entirely omitted. It definitely specified the working strains to be allowed on the different parts of the structure, according to the service they were to perform.

"A successful bridge engineer, from the American point of view, must be something more than a mere calculator of strains. This is the most elementary part of the duty, and does not come with the province of designing. After the selection of the skeleton form and relative proportions of panels, depths and widths of span, a very moderate knowledge of mechanical mathematics would enable any one to determine the strains in an American bridge. He must, in addition to his knowledge as to the effects of varying forms and proportions, have a full knowledge of the capacity of his forms and their connections, and also of the practical processes of manufacture and erection. He must know how his design can be made and put together, and whether it is so harmonized in all its parts and connections, that each part may do its full duty under all possible conditions of service. In addition to knowing all the elements that make up a perfect design, he must have the instinct of designing or the power of adapting his knowledge to any individual case, in order to obtain the best or the desired result. The experi-

ence, observation and a sharp competition with men of like knowledge and instinct will give him his position as a bridge engineer."

Mr. Cooper developed at considerable length the modern American system of computation of strains by the use of a diagram of engine and train load, obtaining the maximum shear and maximum moment at any given point in the truss. This method was worked out simultaneously, but independently, by Mr. Cooper and by Mr. Robert Escobar in 1880, and has since been adopted by the various bridge companies and published in the text books of Prof. Merriman and Prof. Burr.

The development of the methods of obtaining knowledge of the strength of materials was then taken up and Mr. Cooper says: "To-day every first-class bridge manufactory has its complements of testing machines, to test with all the refinements either samples of the material or full-sized members in compression, tension or traverse strain. Our knowledge of the strength and capabilities of our material and of the usual forms employed in the American style of bridge is such that no first-class bridge company in America hesitates to accept the clause now general in all specifications, that 'full-sized members may be tested to destruction,' with the sole proviso that the expense of testing and cost of the piece shall be paid for by the purchaser if it satisfies the requirements of the usual specifications. This positive knowledge of the capacity of our full-sized members marks one of the great advantages of our system of bridges over all others. We, therefore, have a right to claim, that as our working strains are as low and in many cases lower than those used in Europe, with our more perfect knowledge of the strength of our members, we have in our first-class structures a greater factor of security than prevails in European bridges.

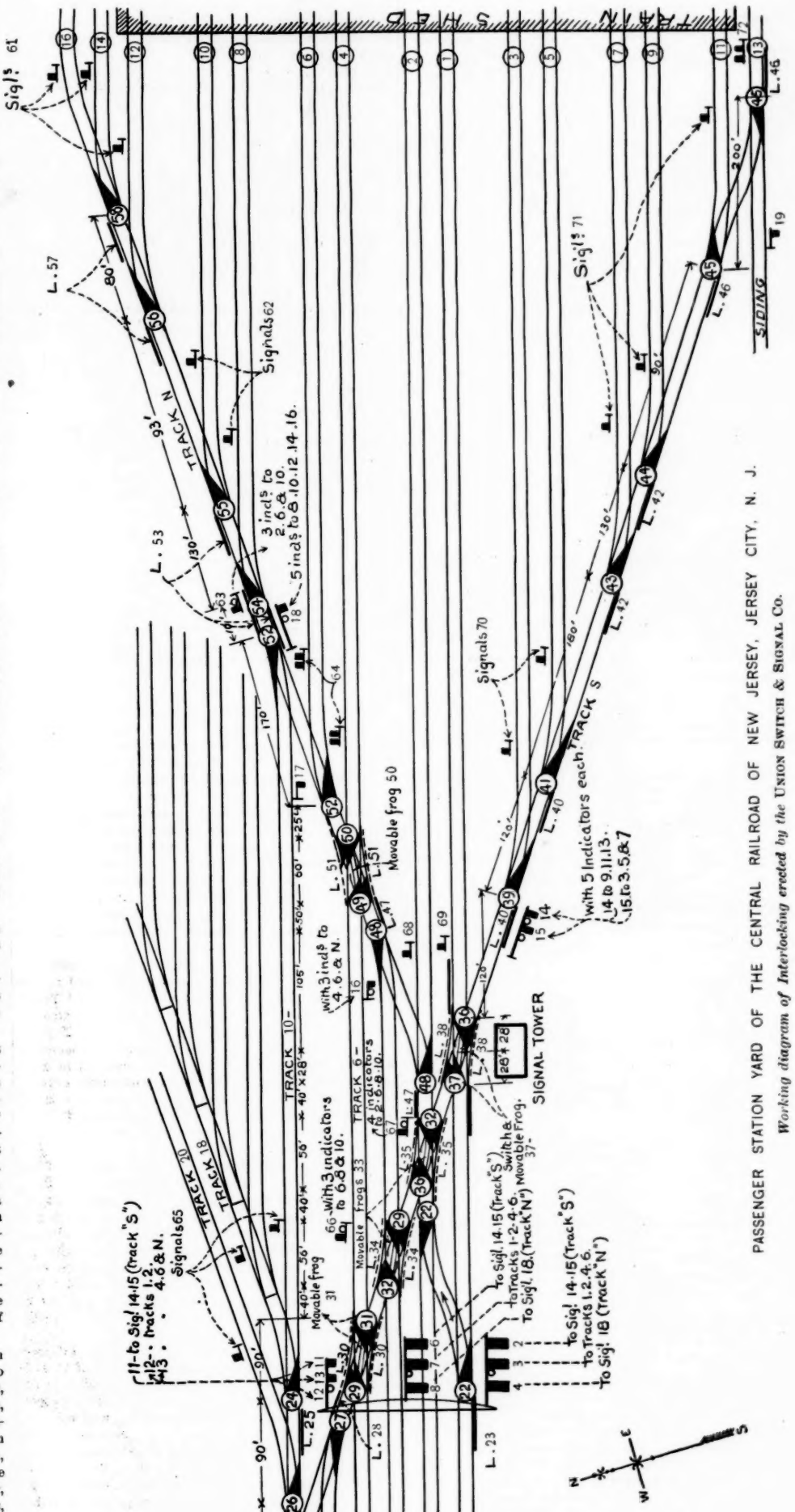
"There are to-day in America more than forty bridge building companies manufacturing railroad and highway bridges. Of these, at least a dozen are capable of constructing bridges of every size in a first-class manner. The shops, which can be called especially shops capable of constructing the largest class of railroad or highway bridges, are capable of turning out by the year 125,000 tons of bridge work. It would be safe to estimate that all the shops could turn out 200,000 tons, or approximately 80 miles of 100-ft. spans of single track railroad bridges, per year, if their plant were devoted exclusively to this work. Other iron work, as roofs, iron buildings, piers, elevated railroads, etc., however, make a considerable figure in their yearly output. Some few of the bridge shops have been constructed to do riveted work almost exclusively.

"The surety of the fitting of the members of even the largest structures after they have passed through a properly organized bridge shop is such that no assembling of the finished members of a structure is ever made at the shops, except in extremely crooked and complicated structures, and even then not as a whole, but only sufficient to test the fitting of specially intricate connections."

A general description of the parts of a typical American bridge was given, and a statement of the great advantages offered by the pin-connected structure for rapid erection. The case of joist erecting on the Cairo Bridge, which was described in the *Railroad Gazette* some months ago, was cited, and photographs of the span in various stages were given.

The statement was made that "with the exception of not over a few score spans, the longest of which are 180 ft., lattice bridges, the iron bridges of the United States, for spans of over 100 ft., amounting to about 7,000 spans, aggregating 210 miles in length, are of the pin-connected type. * * * The longest pin-connected truss span in existence is the recently completed channel span of the Ohio River Bridge at Cincinnati, 545 ft. from centre to centre of end pins, 84 ft. deep at the centre and 60 ft. at the end posts; panels, 27 ft. 1½ in.; trusses, 30 ft. apart, centre to centre. It carries a double-track railroad between the trusses, and has on each side a wagonway and foot walk 16 ft. wide. The persistence of the pin-connected type of structure, now that the bridge engineer acting for the railroad companies has become an important factor in the problem of bridge construction, shows that it is not solely due to the preferences of the manufacturers; but that the operation and maintenance of such structures are also in favor of this type."

"Taking from the Railroad Commissioners' report such data as appeared correct and complete, and adding thereto this additional information [from the railroads direct], avoiding as far as possible any duplication of the same roads, data covering nearly 60,000 miles of railroad, fairly distributed over the whole of the country, were obtained. In order to make these data as nearly comparable as possible, the length of all double-track bridges was reduced to the corresponding length in single-track bridges. In like manner, the length of all main tracks, omitting sidings and turnouts, was put into terms of single track. Elevated railroads, which are composed mostly of bridges or trestles, have been omitted entirely. Table No. 1 gives the general data as to quantity of bridges and trestles and the average rate per mile of track. It shows that the relative amount of bridges and trestles varies in different districts from 58 ft. per mile to 231 ft. per mile. This last, however, is excessive, from including the crossing of Lake Pontchartrain, near New Orleans, on a trestle 22 miles long. Omitting this, we would get only 162 ft. per mile as the maximum. These variations are not entirely due to geographical location, as might appear at first thought. They are also affected by principles governing the original location of each road or division of a system. The alignment and grade may have been sacrificed to the avoidance of bridges or trestles, or the contrary. From the large


PASSENGER STATION YARD OF THE CENTRAL RAILROAD OF NEW JERSEY, JERSEY CITY, N. J.
Working diagram of Interlocking erected by the Union Switch & Signal Co.
SIGNAL TOWER
TRACK N
TRACK S
SIDING
NEWARK OUT
NEWARK IN
MAIN OUT
MAIN IN
LOCK & SIGNAL with 4 Indicators
Movable frog 50
Movable frog 33
Movable frog 31
Movable frog 37
Signals 62
Signals 70
Sigl's 71
Signals 65
With 3 ind's to 4.6.& N.
With 3 indicators to 6.8.& 10.
With 5 Indicators each TRACK S
1.4 to 9.11.13.
1.5 to 3.5.& 7
To Sigl. 14.15 (Track "S")
To Tracks 1.2.4.6.
To Sigl. 18 (Track "N")
To Sigl. 14.15 (Track "S")
To Tracks 1.2.4.6.
To Sigl. 18.(Track "N") Movable Frog.
11- to Sigl 14.15 (track "S")
12- " tracks 1.2.
13 " 4.6.& N.

mileage covered by our table, we can rely with considerable confidence upon our average.

TABLE No. 1.

System of railroad, or state.	Miles of road.	Total length of bridges and trestles in feet.	Lineal ft. of bridges and trestles per mile of road.
New York Central and West Shore railroads	2,894	364,722	126
New York, Lake Erie & Western Railroad	1,514	95,509	63
Other roads in New York	3,586	445,900	130
Roads in Pennsylvania	4,352	336,957	77
Roads in New England	2,199	176,700	80
Wabash System	1,636	160,025	98
Missouri Pacific System	4,707	566,953	120
Chicago, Milwaukee & St. Paul Railroad	5,727	614,736	107
St Louis & San Francisco Railroad	1,441	130,075	90
Denver & Rio Grande Railroad	1,458	102,195	70
Union Pacific Railroad	4,754	276,032	58
Louisville & Nashville Railroad	2,495	322,679	123
Queen and Crescent System	1,139	299,222*	231*
Roads in Illinois	8,539	707,535	83
Roads in Michigan	4,151	249,345	60
Roads in Iowa	7,778	1,049,386	135
Central Railroad & Banking Co. of Georgia	1,487	173,975	117
Totals	59,807	6,071,946	101

* Including the crossing of Lake Ponchartrain, a trestle 22 miles long.

"Taking, therefore, 100 ft. per mile as our basis of estimate, we have for the 160,000 miles of railroad in the United States, 16,000,000 ft. or 3,030 miles of bridges and trestles.

TABLE No. 2.

Miles of railroad	26,228
Trestles and spans under 20 ft	2,299,758
Spans from 20 to 50 ft	85,181
Spans from 50 to 100 ft	94,165
Spans from 100 to 150 ft	149,121
Spans from 150 to 200 ft	80,551
Spans from 200 to 300 ft	29,542
Spans from 300 to 400 ft	5,677
Spans from 400 to 500 ft	1,211
Spans over 500 ft	1,040
Total	2,746,246
Average per mile of road	104.7 ft.

"Table No. 2 gives the distribution of the bridges upon 26,000 miles of railroad into spans of different lengths. Uusing this as a basis of estimate, the 3,030 miles of bridges and trestles in the United States should be distributed as follows:

Trestles and spans under 20 ft	2,424 miles	=	727,200 spans.
Spans from 20-50 ft	121 "	=	18,150 "
" " 50-100 ft	130 "	=	9,100 "
" " 100-150 ft	100 "	=	8,000 "
" " 150-200 ft	109 "	=	3,300 "
" over 200 ft	56 "	=	1,150 "
	3,030 "	=	766,900 spans.

"The above includes all bridges of either wood or iron. Using the detailed information in the author's possession as to the bridges on the above 26,000 miles of railroad, which are of wood, combination and iron, we obtain the following estimate for the amount of iron bridges on our railroad system.

Iron spans under 20 ft	17 miles	=	5,100 spans.
" 20-50 ft	86 "	=	12,000 "
" 50-100 ft	66 "	=	4,600 "
" 100-150 ft	93 "	=	3,900 "
" 150-200 ft	69 "	=	2,100 "
" over 200 ft	49 "	=	950 "
Total	380 "	=	29,550 spans.

"The author's own office records contain the following iron bridges over 200 ft. spans, and they are very incomplete for spans less than 300 ft

Spans over 500 ft	2.5 miles.
" 400-500 ft	3.9 "
" 300-400 ft	5.0 "
" 200-300 ft	15.0 "
Total	26.4 miles.

"From the previous figures it would appear that there are now in existence on our railroads the following wooden trestles and bridges:

Trestles and spans under 20 ft	2,407 miles.
" " 20- 50 ft	35 "
" " 50-100 ft	64 "
" " 100-150 ft	97 "
" " 150-200 ft	40 "
" " over 200 ft	7 "
Total	2,650 miles.

"Of the 2,400 miles of wooden trestle, we can consider one quarter as only temporary, to be filled in as embankment. Of the remaining 1,800 miles at least 800 will be maintained in wood. This leaves 1,000 miles to be replaced gradually with iron bridges and trestles of such spans as may be most suitable for each location, probably from 50 to 200 ft. This would ultimately make 1,600 miles of bridges for the 160,000 miles of railroad now in existence, of which only 380 miles are in iron at the present time.

"In consideration of the facts already presented, it need not be a matter of surprise that bridges have failed under train service in America. * * * In the paper referred to [Mr. Thomson's] 251 bridges are given as the number of failures in the last ten years, classified as follows by the author of the paper: 57 knocked down by derailed trains; 30 "square falls;" 96 uncertain; 5 occurred during replacement or repairs, and 63 unclassified. That the great majority of these bridges were old and defective wooden bridges is not mentioned. * * *

It is a very gratuitous claim to assume that the bridge accidents on railroads in America are in any manner due to the accepted forms of our bridges, or that other forms of bridges would have given different results under the same circumstances. The number of bridge accidents on American railroads, due to causes or forces which a bridge should be designed to meet or resist, is an exceedingly small one when compared, as it should be, with the total number of bridges on our railroads, and when the circumstances under which many of them have been built are given proper consideration. * * * The writer does not know of a single case of the failure of a modern all wrought-iron American railroad bridge which has failed under legitimate train service. He has had knowledge of many bridges which have for years done far beyond their intended duty with satisfaction.

Mr. Cooper closes his paper with extended tables of the results of tests of columns and eye-bars at Watertown Arsenal and at various bridge works.

DISCUSSION.

Mr. D. E. HOYT (Chf. Eng. B., R. & P.) thinks a pin-connected bridge just as capable of withstanding a shock as a lattice bridge. He mentioned a case within his own experience in which a derailed truck was thrown through a pin-connected truss with great force. The bridge stood, although a latice bridge would probably have been demolished.

Mr. G. H. Thomson (Bridge Eng. N. Y. C. &. H. R.) took exception to the statement made that there are no lattice spans in the United States of over 180 ft. length. He mentioned 1,700 feet of lattice bridge in spans of over 180 ft. in use 17 years on the New York Central; also the Billows Falls bridge, having two spans of 260 ft. each; one on the Erattleboro & Whitehall of 216 ft., and one in the State of New York of 220 ft. Still others could be mentioned. On the New York Central alone there are 2¾ miles of lattice in spans of over 100 ft.

This paper was followed by one on Timber Trestle Bridges, by Mr. C. Palmer (Supt. Bridges and Buildings C. & N. W., Peninsular Div.), which was intended as a discussion of the paper by Mr. Onward Bates on the same subject. The secretary stated that Mr. Bates' paper would not be presented at this convention.

Mr. Palmer's paper was followed by one by Mr. H. B. Seaman on a componential truss for a traveling crane. This is a description of a very ingenious and novel device to meet a special problem which we hope to illustrate in a later issue.

The Secretary read a paper by Messrs. O. Chanute, W. H. Breithaupt and J. F. Wallace on the Sibley bridge. The paper was unusually complete and was illustrated by many drawings. The problems of the location and foundations were discussed by Mr. Chanute, while the other writers dealt with the superstructure.

Major O. E. MICHAELIS, U. S. A., followed with a paper on the Lime Sulphite Fibre Manufacture in the United States. This paper is the result of some special study lately made in the manufacture of wood pulp for paper making, and dealt specially with the different digestors in use and the problems which they are designed to meet. The kernel of the matter is that this industry is one destined to be very important; the present methods are quite imperfect, and the field is a promising one for young engineers.

Mr. J. E. WATKINS, curator of the museum of transportation, etc., Smithsonian Institute, Washington, read a long paper on the Development of the American Rail and Track. The paper was purely historical, and was illustrated by drawings and models of early rails used both in England and the United States. Mr. Watkins wishes it understood that this is but a preliminary paper, and is subject to additions and corrections. For that reason he hopes that advance proofs will be sent out before the paper is published in the *Transactions*, and wishes to receive suggestions from all persons who have knowledge of the earlier forms of permanent way in America.

Friday evening was devoted to the annual address of the President, Mr. Max J. Becker, Chief Engineer of the Pittsburgh, Cincinnati & St. Louis. Mr. Becker made a general review of the progress of engineering science, treating of electricity, rapid transit in cities and inclined plane railroads, water-works, sanitary engineering, streets and highways, canals and hydraulic engineering, and finally, and at most length, of railroads. The address was a very able one, and will be an interesting addition to the *Transactions* of the Society, but it was too general in its character to be profitably presented in an abstract.

Mr. Becker pointed out that the most important characteristic of to-day in the general technical conduct of railroads is the tendency towards uniformity, as shown in the gradual elimination from our systems of all unusual gauges, and more recently in the introduction of the uniform code, of uniform couplings, etc. Perhaps the most remarkable feature of recent railroad engineering is the increase in great bridge structures. In 1862 Mr. Becker made the triangulation for the Ohio River bridge at Steubenville, having a span of 320 ft. This was the first long iron bridge over the tributaries of the Mississippi River. There are now 12 great bridges across the Ohio. Whether the final development of the iron or steel bridge will be found in Mr. Lindenthal's projected structure across the Hudson River, or whether still greater spans will be used in bridging the British Channel, is a question which may interest some of the younger members of the society. In concluding President Becker glanced briefly at the great growth of engineering literature in America.

The session of Saturday morning was devoted to the consideration of the natural causes of impurities in water supplies of great cities, and to a discussion of some of the possible remedies. It was opened by a very admirable paper by George W. Rafter, of Rochester, N. Y., who described the characteristics of various forms of organic life, as he had observed them in the reservoirs of Northern and Western New York. In the discussion which followed Messrs. Croes, Worthen, Francis, Stearns, Whinnery, Fteley, Brush and McAlpine took part. It was proposed to inaugurate a system by which a committee of the Society shall put itself in communication with the engineers and officers of various municipalities with a view to acertaining the special difficulties arising in various places, and also with a view to making clearer to the general public the difficulty of avoiding the offensive taste and odor in public water, and the comparative harmlessness of water which is so affected.

Mr. WORTHEN held that the only way to avoid disagreeable taste and odor is by keeping the water in circulation, and for that reason he would use small reservoirs. Smell, he said, is only a molecular arrangement of particles. To get rid of it you must rearrange your particles. Mr. Francis spoke briefly in confirmation from his own experience of Mr. Worthen's theory with regard to circulation.

The morning hour closed with a few remarks from Mr. Brendlinger, who showed a flash light photograph of the method of injecting grouting back of the masonry of the new Croton aqueduct. As is well known it has been found necessary to fill in by this method the interstices left in the backing, owing to defective work originally. The method explained by Mr. Brendlinger is to drill holes through the arch masonry at intervals of about 10 ft. and pump the grouting in by a double-acting hand fire pump.

At the afternoon session the Society's special committee appointed to examine and report upon the South Fork dam, with a view to ascertaining the causes of its failure, made a verbal report. Mr. J. B. Francis is acting as chairman of that committee, and Mr. Alphonse Fteley Secretary. The other members are Mr. Worthen and President Becker. Mr. Fteley made the verbal report. He explained that the conditions had already been so fully set forth by the technical papers that it is unnecessary for the committee to make an extended preliminary report. Surveys of the drainage area will be made and means will be taken to collect all possible evidence, and the committee hopes at the end of the summer vacation of the society to make a careful report, and it is possible that then some of the statements and theories already advanced will require to be somewhat modified. Meantime it will be premature to give a positive opinion. It is certain that the rainfall was very great, if not unprecedented. When the committee went out they passed over 26 trestles that now take the place of as many bridges in the Juniata Valley, and the experience on both slopes of the Alleghenies indicates an unprecedented rainfall. At the same time it will be necessary to determine accurately the drainage area from which the South Fork reservoir was fed. Then, with the other data which can be collected, it will be quite possible to ascertain whether or not the spillway was adequate for any storm that might reasonably have been expected, and whether or not the storm which caused the destruction of the dam was of such an unprecedented nature that nobody could have foreseen it. The owners of the dam gave all facilities to the committee and have aided in making extensive surveys. The committee made a careful examination in person of the dam and reservoir, and Mr. Fteley suggested that it would have been interesting to the members of the society could they have seen two venerable past presidents, with rod and level in hand, making an instrumental survey of the dam. Although they were badly out of practice, he thinks that their work would not have been discreditable to younger men. There is no question that the dam was low in the middle, but Mr. Fteley thinks that the difference in the level of the crest has been considerably exaggerated in the reports that have been published.

In the discussion which followed, Mr. Collingwood said that in a recent visit to Elmira he ascertained that the flood in the Chemung was at least 18 in. higher than any previous flood recorded. The highest one known before occurred in 1865, in the winter, when the ground was frozen and covered with snow. He said that stripping the forest from the hillsides had in recent years so far changed the physical conditions that dams which were formerly safe may well now be considered dangerous.

Mr. Macdonald gave an instance coming within his personal observation to confirm the observations of others as to the unprecedented height of this flood. Some years ago he built a bridge over the Potomac at Fall's Bend. This bridge was placed 3 ft. above the level of the bridge which it replaced, and which had before been considered sufficiently high. The new bridge was carried away. The water rose 3 ft. above the bottom chord, and the accumulated drift and the pressure of the flood bent the bridge laterally 2 ft. out of line. Not having been designed to stand such a strain it gave way. This instance indicates that the flood in the Potomac was 6 ft. higher than anything previously known.

Mr. Bogart stated that the Smithsonian Institute and the Signal Bureau have promised to furnish the society with all possible data concerning the actual rainfall in the area affected by the flood.

Considerable discussion took place as to the failure of the original dam and the method of repairing it. In this discussion Messrs. Brendlinger, Miller, Becker, McAlpine, Fteley and others took part. One story was that the farmers blew up the original dam. This, however, does not seem to be supported by serious evidence. The story that the crest of the dam had been cut down 10 ft. in filling the old excavation was shown to be absurd. Mr. Fteley showed a diagram of the original gate house and sluice-way under the dam. Portions of the masonry remain to-day, indicating that it had been very substantial.

This discussion was followed by a paper by Mr. McAlpine on a suggested method of ascertaining the maximum capacity of automatic spill-ways for earthen dams on torrential

streams. The paper and a brief discussion of the problems, with Mr. McAlpine's preface to it, are of unusual interest and value, coming from the source which they did.

Monday, June 24, was almost wholly taken up with the business meeting. The committee on the relation to each other of the sections of wheels and rails made its final report, which was accepted and the committee discharged. The resolution for the appointment of a committee to prepare standard rail sections for sizes varying by increments of 5 lbs. from 40 lbs. to 100 lbs. per yard under the rules was referred to the board of direction as preliminary to a letter ballot. It seemed the sense of the meeting that the former committee should be appointed. The increased cost of rails due to the present great variety of rolls required in the mills and the desirability of the mills being able to keep rails in stock were the main arguments for the appointment of a committee.

After a report of the committee on standard time, it was decided to send to the various railroad officials and ask their views and co-operation in securing the adoption of the 24-hour system.

Various amendments to the constitution were offered, and after some discussion it was resolved, on motion of Wm. P. Shinn—

"That a committee of seven members be appointed by the president to consider and report upon a systematic revision of the constitution and by-laws, so as to afford the society the best basis for its continued growth and an increased measure of usefulness. All members having suggestions to make or amendments to offer are to send them to the chairman of the committee. The committee, if it decides to recommend any amendments to the constitution or by-laws, is instructed to present the same, together with the views of the committee upon the same, in the manner and within the time provided for offering such amendments. the board of directors to have the committee's report printed and distributed to members. The committee is authorized to confer with any committees appointed for the purpose by the local engineering societies, with a view of determining whether a satisfactory basis can be established for affiliating therewith. The committee shall make a final report at the next annual meeting.

Resolutions to appoint a standing committee to recommend a uniform method of testing the materials used in metallic structures, and to report such requirements for these materials as in their judgment will conduce to the further improvement of the grade of such structures, and a committee to collate all obtainable information in regard to natural impurities in water supply and their remedies were referred to the board of direction for further action.

The following members were chosen to nominate officers for 1890: Stevenson Towle, New York; Major O. E. Michaelis, Augusta, Maine; F. H. Smith, Baltimore, Md.; J. F. Wallace, Chicago; and Arthur Macy, Arizona.

A cablegram thanking the Institute of Civil Engineers for courtesies extended to members was sent, resolutions expressing appreciation of the establishment of the department of American Engineering of the National Museum of the Smithsonian Institution were passed, and various minor matters were acted upon. The meeting then adjourned, and the members inspected the Hyatt system of filters in use at Long Branch.

The annual banquet held in the evening was an enjoyable affair. The genial secretary was in his happiest mood, and his toasts and the responses added greatly to the success of the event.

Tuesday, June 25, the convention resumed the reading of papers, the first being the report of the committee on the relation to each other of the sections of wheels and rails. This will be found in another column. This subject and that of cylindrical wheels and flat-topped rails were discussed by many members.

The Secretary read a paper by Percival Roberts, Jr., in explanation of some experiments on punched and reamed steel flange angles, with double rows of rivet holes, staggered, the tested plates being exhibited. The pieces tested were cut from 6 × 6 × $\frac{11}{16}$ angles. The steel was open hearth, of about 60,000 lbs. tensile strength and of the following composition: Carbon, 0.150; phosphorous, 0.072; manganese, 0.310. The pitches used were 3, 4 and 6 in. Centre lines of rivet holes were 2¼ in. apart, the inside line being 2⅛ in. from the corner of the angle. In the unreamed plates $\frac{13}{16}$-in. punch and 1-in. die were used; in the reamed holes, ⅞-in. punch and $\frac{13}{16}$-in. die, and the holes reamed to $\frac{15}{16}$ in. The results may be summarized as follows:

Per cent. of gain of reamed over punched plates.

	3-in. pitch.	4-in. pitch.	6-in. pitch.
Ultimate strength	26.1	47.8	20.1
Stretch	75.0	69.1	49.4

Per cent. of gain of punched over reamed plates.

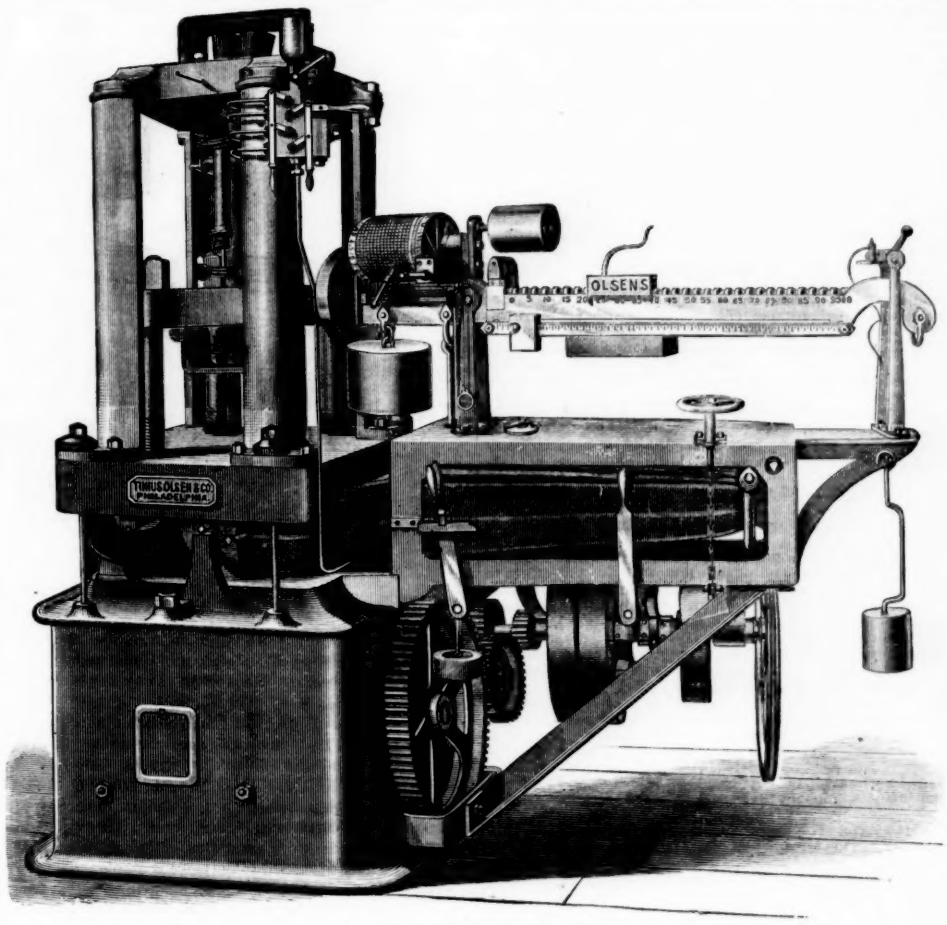
	3-in. pitch.	4-in. pitch.	6-in. pitch.
Elastic limit	13.3	4.9	16.5

The above results are for full section of plates without any deduction from loss in section by rivet holes.

In each case the reamed plates showed a silky fracture and the punched plates crystalline. Specimens of steel tested by drifting were also shown. Mr. Roberts claimed that drifting tests are of no value in this connection, and also that steel plates over ½ in. thick are materially injured by punching. He is planning to make further and extensive tests in this same direction.

The following papers were also read and discussed: The Formation of the Vertical Wall of Water in Floods, by J. B. Francis; The Improvement of Railway and Street Railway Track, E. E. Russell Tratman; The Settling and Filtration Basins of the Vicksburg Water Works, Clarence Delafield; Influence of Temperature during Setting on Strength of Cement Mortars, O. H. Landreth; Metal Track for Railways, E. E. Russell Tratman; The Railways of Mexico, W. Barclay Parsons; Ship Canals, R. E. Peary, and The Van Buren Bridge, C. D. Purdon.

At the end of the evening session, after passing the usual complimentary resolutions, the convention concluded its labors and adjourned.



OLSEN'S TESTING MACHINE.

Made by TINIUS OLSEN & CO., *Philadelphia, Pa.*

Olsen's Testing Machine, with Automatic Adjustment and Registering Devices.

The accompanying illustration shows the machine as arranged for measuring the tensile strength of test pieces. The specimen to be tested is secured at the ends between two plates by wedges passing through rectangular holes in the plates and supported by spherical bearings, which serve to centre and align the sample. The lower plate, or cross-head, has four straining screws with slots and feathers which prevent them from turning. Straining nuts are connected at the lower ends of these screws, and are revolved by bevel gearing operated by the spur-wheels and countershaft. The effect of turning these nuts is to raise or lower the cross head, and the countershaft is arranged so as to give six variations of speed for the downward motion and two for the upper. The cross-head is secured by columns to a platform resting on the weighing mechanism, which consists of three levers connected together, and the pressure on these levers is communicated by an intermediate lever to the weighing-beam of the machine. By this arrangement, any strain imparted to the specimen through the straining screw is transferred to the main lever and can be balanced on the beam. The balancing is effected automatically. There is a coarse threaded screw on the upper portion of the beam, which moves the counterpoise when the screw is revolved by the wheel shown at the inner extremity of the beam. This wheel has a grooved rim for the reception of a driving pinion, and when the latter, which revolves continuously, is in contact with the wheel, the poise will be shifted. The shaft-bearing of the pinion is attached to one end of a lever, the other end of which is controlled by an electro-magnet in such a manner that if the beam rises the pinion is thrown into contact, running the poise outward; and when the beam assumes a horizontal position, contact is broken and the poise remains at rest.

The amount of the strain and the distortion of the specimen are registered graphically by a pencil on a sheet of paper secured to the registering-drum. The pencil is moved axially by the same screw, which operates the poise, so that the line traced upon the paper, measured horizontally, represents the amount of strain; and the paper drum is revolved by the extension of the specimen, this motion being recorded by the pencil. To effect the latter motion small heads are secured to the test specimen, a few inches apart, and small cylinders, partly filled with water, are placed between the heads. The paper drum is also connected with a similar cylinder; and all these cylinders are in communication with a reservoir on the upper part of the machine. By this means any expansion of cylinders and pistons due to the elongation of the specimen causes a corresponding contraction of the cylinder and piston connected with the paper drum and rotates the latter. Thus the diagram of a test can be made to indicate the tensile strength of a specimen, together with its elastic limit and elongation.

These machines, which are manufactured by Tinius, Olsen & Co., Philadelphia, Pa., have been furnished to the Chicago & Northwestern R. R. Co., at Chicago; the Southern Pacific R R. Co., at Sacramento, Cal.; Mr. Henry Warder, Philadelphia; and the Missouri University, Columbia.

The American Society's Committee on Wheels and Rails.

The following is an abstract of the final report of the committee on the proper relation to each other of the sections of car wheels and rails.

The report was in our hands in time for publication last week, but the usages of the society and ordinary courtesy required that it should not be published before presentation to the convention. We have condensed the report somewhat and omitted entirely the appendices.

The preliminary report of the committee was published in the *Transactions* of the Society for July, 1888. Circulars of inquiry asking certain specific questions (reprinted in Appendix A) were sent out in the same manner to all persons in and out of the society, some 500 in all, known or thought to be interested in the question. The responses have been unusually numerous and valuable. Sixty-three responses, many of them very elaborate and complete, have been received from engineers, mechanical officers, rail manufacturers and others, including a large majority of those whose views the committee was most anxious to obtain. All the Eastern trunk lines and numerous other great systems are represented in these responses or on this committee. These discussions will in the aggregate make a large pamphlet, and they are accompanied by many drawings. It was, therefore, impossible to do more than tabulate the specific responses without unduly delaying this report; but the discussions constitute such a valuable collection of practical information as to rails and wheels that your committee unhesitatingly recommends their publication in full.

Your committee was surprised and gratified at finding that, instead of developing the diversity of opinion which is the frequent result of such inquiries, the responses show throughout the degree of agreement as to essentials above noted, amounting almost to practical unanimity in respect to the specific questions submitted, which are those most in dispute; those, namely, concerning the form and general proportions of the head of rails. This unexpected result has greatly encouraged your committee in unanimously recommending, as it now does, the following details as standards for practice:

First.—Your committee recommends a 12-in. top radius as a standard for rail-sections of all weights.

The discussions upon this question show so far as they answer it specifically: In favor of 12-in., "10 to 14-in.," etc., 32; in favor of 12-in. or less, 3; in favor of 12-in. or somewhat more, 6; in favor of 12-in. for coned wheels (Crosby), 1; in favor of 12-in. by implication (Curtis), 1; total favoring about 12-in. top radius, 43; in favor of flat top, 7; prefers flat top (Howe), 1; total favoring flat top, 8.

The prevailing sentiment, which your committee shares, appears to be that the end sought in the suggestion of an entirely flat top between the rounded corners, viz., a wider bearing for the wheel-tread, is a desirable one; but that it is and will be better secured in practice by using a slight curve for the top of the section, instead of a straight line. The evidence is that an entirely flat top is difficult, if not impossible, to roll properly. Inevitable irregularities of track and the usual slight bends in the web, due to the rails lying on their sides when hot, would throw the bearing of the wheel-tread on one or the other corner instead of evenly across the top,

causing early flowage and rounding of section. The standard wheel-tread is now slightly coned, a perfectly cylindrical tread having been first rejected. Were the tread originally perfectly cylindrical, with an even bearing for the whole width of rail head, the necessary gauge play alone would tend to wear it hollow. Under existing conditions wheel-treads, wear slightly hollow, corresponding to about a 12-in. radius, very early in their lives. As a consequence, nearly all rails now wear down to a curved top on the outside as well as the inside of the head. With the top curve the load is sustained centrally and transmitted directly downward through the web. Without it, one or the other corner will sustain the load in practice, and neither long in succession, causing a tendency to split off the side of the head if the metal be in any way defective. Most wheels being worn slightly hollow, the bearing is in practice now tolerably wide. If there were no other difficulty or objection, there is the great practical one that it would be a herculean task to unite the railways of the country in two simultaneous and decided changes of practice. Were this task achieved, there would inevitably be a long period of transition, during which our last state would be worse than the first. For all these reasons, your committee is entirely clear that the attempt to introduce a perfectly flat top is inexpedient.

Second.—Your committee recommends a broad head relatively to depth for sections of all weights, taking care not to go too far in either dimensions, especially in very large or very small sections, or to endanger the flange cutting into the joint.

The discussions upon this question show, so far as they categorically answer it: Total approving above recommendation, 45; disapproving, 2; non-committal or doubtful answers, 3.

Your committee is much impressed with the weight of evidence and opinion tending to show that, in the effort to secure three ends in themselves desirable and proper, too little attention has been paid to metallurgical laws and processes of manufacture in designing rail sections.

[The committee at this point makes an excellent summary of the arguments in favor of more nearly balancing the distribution of metal in the rail section, with which all of our readers must be very familiar by this time.]

Third.—Your committee recommends a ¼-in. corner radius as the standard for sections of all weights.

The discussions on this question show, so far as they categorically answer it: Explicitly in favor of ¼-in. radius, 35; in favor of ⅛ to $\frac{3}{16}$-in., 4; prefers $\frac{3}{16}$-in., 1; prefers by implication, 1; in favor of ⅜-in., 4; total favoring short corner radius, 45; explicitly in favor of ⅜-in. radius or disapproving ¼-in., 4.

Fourth.—Your committee recommends a $\frac{1}{16}$-in. lower corner radius for the head, as the standard for sections of all weight. The discussions on this question show, so far as they categorically answer it: Favor a very small radius (question was asked as to a $\frac{3}{32}$-in. radius), 30; favor still smaller radius ($\frac{1}{16}$-in.), 5; total favoring $\frac{3}{32}$-in. or less, 35; opposed to so short a radius, 5; "possibly too small," 1; "unimportant," 1; non-committal, 4.

The purpose of the very short radius is, of course, to secure as much bearing as possible for the fish-plate, but your committee is unable to see that it can do any harm even if no fish-plate be used. The evidence of the discussions from the rail-makers is that there is no difficulty in rolling the section, even if the corner radius be a point, as some of the sections submitted have it. The specific section on which the question was based showed a $\frac{3}{32}$-in. radius, and it is impossible to say if as many would have approved it had it been $\frac{1}{16}$-in. instead; but from the general tenor of the discussions, your committee feels satisfied that they will do so now, at least, and the principle of the short corner being approved, it necessarily followed that the committee should recommend as short a one as was clearly practicable, which is $\frac{1}{16}$ in.

Fifth.—Your committee recommends that, starting from a sufficient base width of head to give ample bearing for the joint, or to conform to recommendation No. 1, the sides be carried up vertical, as to the standard for sections of all weight. The discussions on this question, so far as they categorically answer it, show: Explicitly in favor of vertical sides, 37; in favor of vertical sides or nearly so, 1; in favor of vertical sides or an inward flare, 1; in favor of vertical sides or an outward flare, 2; in favor of vertical sides or tangents, slight incline for curves, 1; total favoring in substance vertical sides, 42; opposed to vertical sides, 8.

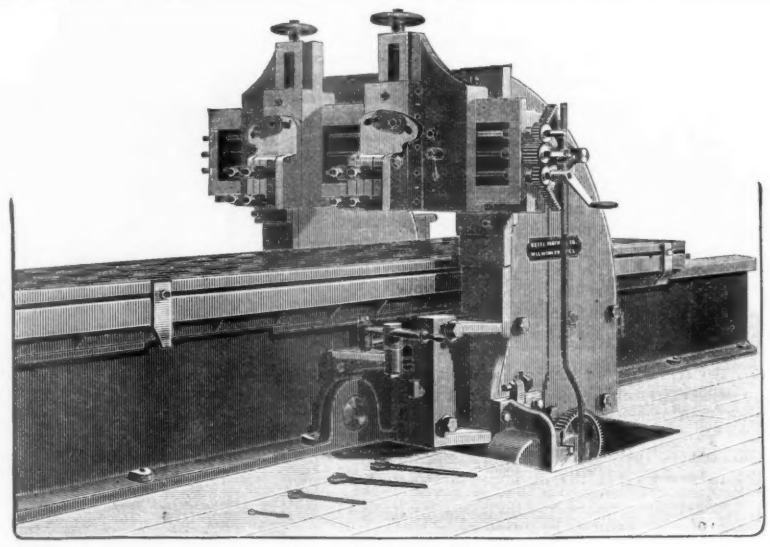
As respects any of the preceding recommendations, your committee sees no reason why they will not give an equally favorable section for either curves or tangents, and either for angle-bar joints or for any form of base support joint. An argument of some strength is advanced in favor of an inward flare for such joints, but your committee sees no gain therefrom corresponding to the loss.

Your committee likewise announces as final conclusions the preliminary conclusions as to the general laws of rail and wheel wear included in their preliminary report, which conclusions, with a summary of what may be called the vote thereon, are appended hereunto in Appendix A.

Your committee dissents from the view expressed in a number of the discussions, that it would be wise or proper for it at this time to proceed beyond the above recommendations to elaborate details for standard sections complete. All that is included within the legitimate scope of its instructions, and possibly somewhat more, it has now done in this report. Anything beyond this, in the direction indicated, must of necessity be done by a committee expressly appointed to recommend standard forms of rail sections, and not merely to "consider the proper relations to each other of the sections of railway wheels and rails." The committee would be doing violence to its sense of duty, however, if it should close this report without explicitly calling the attention of the society to the fact that there appears to be a general desire that such action should be had; a readiness to concede individual preferences freely to secure it; and much fewer and less important special preferences to concede than can well have been anticipated by any one before the discussions herein abstracted had been gathered. The fact that, with no such probability in sight, such substantial unanimity has developed in respect to those parts of a rail section which were, of all others, the most likely to cause dispute, encourages the committee to believe that nothing more is needed than a moderate amount of intelligent effort to secure the adherence of three-quarters, at least, of the engineers and railway mileage of the country to a set of standard sections elaborated from the recommendations herein as a basis.

A New Special Planing Machine.

The cut herewith shows a special machine for planing wrought iron and steel when heavy duty is desired. The machine is made in two styles and two sizes. The style shown is that known as the "low upright" machine, and will take in work 42 in. wide by 12 in. high. A similar machine is also made to take work 36 in. wide by 12 in. high. The other style is known as the "high upright" machine, and will take work 42 in. wide by 36 in. high; a similar machine is also made to take work 36 in. wide by 36 ins. high.



SPECIAL PLANING MACHINE.

Made by the BETTS MACHINE CO., *Wilmington, Del.*

The design of these machines shows some novel features, and a few are noted here. The impression of massiveness is borne out by the absence of all ornamentation and by large, smooth surfaces. The machine is characterized by simplicity in construction and accessibility for repairs. All fast running parts are bushed with brass, and the whole is intended to withstand rough usage and heavy duties. The bed rests directly on the foundation, is deep and of heavy section, strengthened in the centre and not cut to allow gearing to clear. Its length in regard to the table is ample. The top or ways of the bed are somewhat of a departure, being flat on the top and sides instead of the usual V shape. The bed is braced by numerous cross-girts of heavy section and the gearing is so placed that there is no necessity to move the bed for any repairs.

The table is extra wide and heavy and is gibbed down. This together with the flat ways makes it impossible to raise the table. The flat ways are adopted with the belief that the best way to take the thrust of the tool is on a flat surface. In addition to this, the pressure of the tool keeps the table down even on side cuts, which is just the opposite of the case of a machine with V's.

The gearing and pulleys are ample for an ordinary 7 ft. wide planer, and have at a convenient point a breaking pin which shears off before the gears can be broken. This pin can be replaced in a few minutes and at a trifling cost, and still allows a machine to be pushed to its utmost without damage. The driving shafts are of steel and of large diameter. The length between gears and pulleys is short, reducing torsion to a minimum. The pulleys are proportioned to return the table at 5 times the cutting speed. The stops or dogs for reversing the motion do not project beyond the edge of the table, which prevents catching or striking the operator. The table can be easily reversed at any time by a single motion of a convenient lever, or it may be entirely stopped without stopping the countershaft. The belts are transferred one at a time and are locked at all times.

The uprights are of box form with a very wide face. They extend down the entire depth of the bed, and are securely keyed and bolted thereto. The cross-head is very heavy and carries two saddles, which are made right and left in order to bring the tools close together; the apron holders are made the same way. The saddles and tool slides are provided with hand feeds and with automatic feeds, independently reversible, or can be thrown out of gear entirely at any time.

This machine is made by the Betts Machine Co., Wilmington, Del.

The Master Car-Builders' Convention.

The twenty-third annual convention of the Master Car-Builders' Association opened at Saratoga Springs, June 25, at 10¼ o'clock a. m.

The convention was called to order by Mr. W. McWood, President, who introduced Mr. D. Lohnas, President of the village of Saratoga Springs. Mr. Lohnas, in an appropriate address, welcomed the members.

It was voted to dispense with the roll call and with the reading of the minutes of the last meeting.

President McWood in his address congratulated the association on the great lessening of friction in the interchange of cars in the past few years. There is now a free and honest interchange all over the country with a minimum of disputes. He drew attention to the fact that the association had not yet agreed upon a standard axle, and pointed out the necessity of the adoption of standards for 50,000 and 60,000-lb. cars.

The Secretary reported that since the last report published one active and one representative member have died and three active members have resigned. Seven new names have been added to the active membership, and three railroad companies not heretofore represented have appointed representative members. The roll now shows 140 active, 93 representative and 5 associate members. The number of cars represented in the last report was 755,743; this number has since slightly increased. The cash on hand June 9, 1888, was $90.44; collected to date (dues, $4,465; miscellaneous, $599.55), $5,064.55; total, $5,154.99. The disbursements for the year were $5,043.78, leaving a balance of $111.21.

The railroad commissioners of the state of New York were present and were introduced by the President. Mr. Rogers, the Chairman of the board, responded for the commission. Mr. Rogers said that the commission watches with interest the efforts of the Master Car-Builders' Association to promote the objects of its existence. The Commission is aware of the benefits arising from the work of this organization. Its influence for good is not only what it does for itself, but it is looked up to by other organizations of kindred nature, such as the railroad clubs of the country. Mr. Rogers suggested that the physical limit to the capacity of railroads has been nearly reached. When, for instance, you put 60,000 lbs. on a freight car, the effect on the rails and road-bed, and especially on the bridges, is such that it would seem that the time has come when this limit has been reached, and if we go much further the railroads will have to be reorganized and rebuilt upon a different principle. When the law regarding steam heating was passed it was the profound hope of the commission that something would be done about ventilation. He knows of nothing pertaining to railroading which the public would appreciate more than a proper ventilation of passenger cars.

The Secretary read an invitation to the members and their wives from the Albany Day Line to avail themselves of the trip between Albany and New York.

It was voted that sessions be held from 10 a. m. to 1 p. m. and from 3 to 5 p. m.

A nominating committee was appointed as follows: C. A. Schroyer, J. Townsend, B. K. Verbryck, E. Chamberlain and F. D. Adams.

A committee of three was appointed to draw up resolutions expressing the appreciation of the association for the services of the retiring Secretary, Mr. M. N. Forney. The committee consisted of E. B. Wall, G. W. Rhodes and John Lentz.

The following auditing committee was appointed: J. N. Barr, E. Chamberlain and J. McKenzie. Angus Sinclair was unanimously elected associate member.

Messrs. McIlwain, Marden and Schroyer were appointed a committee to report a substitute for or an amendment to By-law 3.

The committee to formulate a code of rules for the interchange of all cars in passenger service (T. A. Bissell and E. Chamberlain) reported that they had, after careful inquiry, been unable to find that there is an immediate demand for a code of rules governing the interchange of passenger cars; and they have yet to find an instance where unnecessary delay has been occasioned in such interchange owing to the absence of a general code of rules, unless it be on account of different heights of couplers; consequently they would recommend that the attempt to formulate a code of rules for the interchange of passenger cars, including drawing-room and sleeping cars, be for the present, at least, abandoned, unless the association thinks best to fix a standard height for draw-bars.

In the afternoon session the report of the committee on the interchange rules for passenger cars was discussed. Mr. Casanave suggested that the rules for the interchange of freight cars were practicable for passenger traffic, and saw no necessity for making new ones. Mr. Barr considered the subject one of limited importance, and hardly warranted devoting much time to it. Mr. Schroyer thought the question of the adjustment of brake leverages should come in, as differences in adjustment and in brake pressure on different roads caused flat spots from the sliding of the wheels, and he did not wish to pay for flat spots for which other people were responsible. Mr. W. H. Day was very anxious that the standard height of the draw-bar for passenger cars should be fixed by the association. His road is re-equipping its passenger stock with 36-in. steel tire wheels, and has been raising the height of the draw-bar to 33 in. They have had much annoyance from the fact that their

cars going on to other roads would not couple with passenger cars on those roads, and were consequently returned in freight trains much to their injury. A discussion ensued as to whether or not the association already has a standard. According to the printed annual report the standard height for draw-bar for passenger cars has been 36 in. since 1869. Mr. Lentz reminded the convention that four years ago, or thereabouts, a committee was appointed to consider this matter, and recommended a standard of 34 inches, which was not adopted, and he considers that there is no standard now of the association. Mr. Adams suggested that he should, without hesitation, have said that the standard height is 35 in., in which President McWood and many others concurred. Mr. Wall moved that a committee of five be appointed to continue the subject of this report and to report at the next convention. This motion was carried. Mr. Marden pointed out the importance of keeping the centre of gravity of passenger cars low, and specified the case of some Worcester excursion cars which were absent from his road and were raised 3 in., the result being that the increased motion of the cars was at once perceptible by all who rode in them. Mr. Wall moved that the Committee on Subjects take into consideration the question of the height of draw-bar for passenger cars, and the advisability of making any change. There was considerable discussion as to whether or not this subject should also include freight cars, but that proposition was not approved and the motion was carried.

The next report taken up was that of the committee on standard journal box lid for 60,000-lb. and 40,000-lb. cars Mr. Marden, the chairman, read the report. The committee had sent out circulars to which they received seventeen replies, thirteen of which were in favor of the Fletcher lid, and it therefore recommended the adoption of this kind of lid as a standard, and that one size be used for all freight cars. The committee was instructed to prepare drawings for such a lid, with a view of submitting them to letter ballot for adoption. There was considerable discussion about the advisability of adopting a standard lid before a standard journal box should be adopted.

The next report was that of the committee upon journal lubrication and best means of economizing oil. This was read by Mr. Lauder of the committee. The committee held that there is little use in considering means for improvement in journal lubrication until a journal box is adopted which will hold the oil and exclude the dust. They pointed out that a watch, which is an instrument of great precision, and with slight motive power, is on an average lubricated once in three years, this remarkable result being due to the perfect manner in which its running parts are protected from dust and air. The standard journal box which has been adopted is entirely defective in the means taken for excluding dust. At the same time it seems to limit the field of inventors in such a way that no efficient dust guard can be contrived. The rational thing to do is to use a box that will exclude dust and keep in the oil, and such a box has been in use to a limited extent on several railroads. The committee knows of cars so equipped that have run upwards of 100,000 miles with less than $\frac{1}{64}$ reduction in the diameter of journal, making 200 miles daily over a very sandy road, and the box opened to have the oil renewed at intervals of 6 months.

In the discussion which followed, Mr. Lauder explained that the box referred to was the Bemis journal box which was running on the Old Colony on Cape Cod, a very trying piece of track in the matter of dust, and that it has been run 11 months without opening.

At the Wednesday morning session the Nominating Committee presented the following names for officers for the ensuing year: President, Wm. McWood, Vice-presidents, C. A. Schroyer, E. W. Grieves, J. S. Lentz; Treasurer, J. Kirby; Executive Committee, R. C. Blackall, E. Chamberlain and F. D. Casanave.

The first business taken up was the report of the Arbitration Committee on the revision of the rules of interchange. Vice-president Grieves was called to the chair. Resolutions were adopted limiting the time of any one speaker to three minutes, and providing that the rules as revised in 1888 should be read by sections, and if no objection was offered each section should be considered as adopted. The rules were accordingly taken up in this way.

The discussion which ensued was careful and occupied the whole day, but we shall attempt to make no abstract of it. The rules were amended in several particulars, generally following the recommendations of the Arbitration Committee. It is hoped and expected that there will be little occasion for further consideration of them for some years to come.

At the noon hour miscellaneous questions were taken up. By special permission Mr. L. S. Coffin addressed the convention for half an hour on the general subject of danger to trainmen, urging the adoption of automatic couplers and other safety appliances. He spoke with his well-known enthusiasm and pathos.

Certain amendments to the by-laws were adopted, one with regard to choosing a place of meeting, another to include in the active members joint car inspectors, and another doing away with the provision that associate members must attend the conventions of the association at least once in three years.

The Master Car-Builders and their friends have been entertained very handsomely by the committees appointed for the purpose. Carriages have been in daily attendance for the use of the members and their friends, and nothing has been left undone which would add to the pleasure and comfort of those in attendance. Tuesday evening a very enjoyable entertainment was given in the hotel parlors, followed by a ball, which was well attended. Much credit is due the Delaware & Hudson Canal Co. and its officers for their untiring efforts to entertain the members and their friends. The company's lines were thrown open for the free use of those in attendance at the convention for two weeks. This company, in conjunction with the Lake George Transportation Co., has extended an invitation to the members and their friends to make an excursion to Lake George on Friday. Governor Hill and Mayor Maher, of Albany, are expected to be present.

Following are the reports on Brake Gear and on Car Heating:

REPORT OF COMMITTEE ON STANDARD BRAKE GEAR FOR AIR-BRAKE CARS, WITH BRAKE SHOE FOR IRON BEAM.

In the study of this problem, your committee has had constantly in view the necessity of providing an efficient foundation brake, in order that the railroads may realize to the greatest extent the advantages of the large investments they are now making in air brakes. A brake gear that for many years may have given good results when operated by hand is found inefficient when actuated by air, and any attempt to perpetuate such a gear nullifies the advantage gained by the introduction of air power. There are to-day many cars running in this country where the air-brake mechanism has simply been coupled to the old style foundation brakes, with the result that the gear is constantly out of order, and the advantages expected from the use of air only partially realized. If trains are to be efficiently controlled, we must attach the air mechanism to a thoroughly reliable and mechanically designed system of foundation brakes.

It may at first appear that some of the recommendations of the committee are very radical, and that they involve a greater expense than is necessary, but your committee is prepared to stand on the proposition that it is useless for any road to adopt air as a braking power unless suitable and effective gear is provided to operate in connection with it. We have not made one single recommendation without careful study and experiment, and the question of expense has received constant consideration. The problems involved will be taken up in their natural sequence.

Brake Power.—With the application of the air brake to freight cars it is important, on account of interchange, that all cars should be uniformly braked in proportion to their weight. In the absence of any practicable device for regulating automatically the brake power on a car in proportion to the load carried and the speed at which it may move, the maximum theoretical power which can be applied is equal to the light weight of a car on the rails, assuming the common practice that the co-efficient of friction between brake shoes and wheels is the same as that between wheels and rails. Owing, however, to different conditions of rail and reasonable variations of air pressure, experience has shown that it is advisable to use a power somewhat less than this, and that 70 per cent. of the light weight gives the most satisfactory results and insures against liability of sliding wheels. This braking power should be generated from a train pipe pressure of 70 lbs. per square inch.

The value of a uniform train pipe pressure, and of having all cars braked proportionately the same, may be seen in the case of two roads interchanging cars, the one carrying a train pipe pressure of 60 lbs. and applying a brake power of 80 or 90 per cent. of the light weight, and the other carrying a train pipe pressure of 80 lbs. and applying a brake power of 70 per cent. of the light weight. Cars of the former running over the lines of the latter would have an excessive brake power with the latter's pressure, and the liability of sliding wheels would be very great, whereas cars of the latter running over the lines of the former would not have sufficient brake power, and the value of the brake would, therefore, be partially lost. The importance of controlling the air pressure uniformly to the figure above-mentioned cannot be over-estimated. If it is allowed to go beyond this the expense of wheels removed on account of flat sliding will undoubtedly be felt and the value of the air brake impaired. Your committee, therefore, recommends that the leverage be proportioned to 70 per cent. of the light weight of the car and the maximum air pressure be 70 lbs. to the square inch.

System of Levers.—As it is desirable that the arrangement of levers and rods in any brake gear should be as simple and have as few connections as possible, your committee has prepared plans, showing the best arrangement for each of the following conditions: Inside connected brakes with hand brakes at both ends. Outside connected brakes with hand brakes at both ends. Inside connected brakes with hand brakes at one end. Outside connected brakes with hand brakes at one end.

Brake Beams.—Your committee recommends the adoption of two brake beams, No. 1 to stand a load of 7,500 lbs., with a maximum deflection of $\frac{1}{10}$ in., and No. 2 to stand a load of 15,000 lbs., with a maximum deflection of $\frac{1}{10}$ in. Beam No. 1 is intended for all freight cars now constructed and beam No. 2 for passenger and freight cars in the event of the adoption of a larger cylinder, or the introduction of a device for graduating automatically the braking power in proportion to loads and speed. Your committee advises against the use of a beam of any less capacity than No. 1, for the reason that any gain in first cost would be insignificant when compared with possible loss in security and multiplication of standards.

The very small deflection admissible is made requisite by the fact that the power generated in the brake cylinder of the air-brake is multiplied by means of levers in order to deliver the required brake power to the beams, and it is evident that any deflection or motion at the beam is multiplied at the cylinder to exactly the same extent as the cylinder power is multiplied at the beams; hence all unnecessary motion or deflection at brake beam must be eliminated. To illustrate: If a passenger coach required a brake power of 54,000 lbs. delivered from a cylinder generating 4,700 lbs., there is a multiplication of the power by 11.4, and $\frac{1}{4}$ in. deflection at each of the four beams would give nearly 3 in. travel of the piston, which is a serious waste, detracting from the efficiency of the brake.

In order to demonstrate that the load of 7,500 lbs. stipulated for beam No. 1 is correct, your committee would state that this is the limit of the stress with a reasonable margin of stock in shoes which the present Westinghouse freight brake mechanism is capable of exerting on the brake beam in every-day service.

A load of 15,000 lbs. is stipulated for brake beam No. 2, because we already have passenger coaches weighing 60,000 lbs. upon four-wheel trucks, and if we allowed 90 per cent. as a brake power, a stress of 13,500 lbs. would be exerted on each of the four beams. We now have passenger equipment cars weighing from 90 to 100,000 lbs. on six-wheel trucks with brakes applied to all wheels where the brake beam pressure is from 14,000 to 15,000 lbs., and as it is also possible that a brake device may be brought out for graduating automatically brake power in proportion to the loads and speed, your committee considers it desirable that due allowance should be made for such requirements, and therefore stipulates the above load of 15,000 lbs.

A series of tests was inaugurated to determine the strength of the various forms of iron beams under the immediate supervision of Mr. A. S. Vogt, Mechanical Engineer, P. R. R.; Mr. R. W. Bayley, of the Westinghouse Air Brake Co., and Mr. S. P. Bush, Assistant Engineer of the P. C. & St. L. R. Your committee, in inviting owners to send samples of beams for test, stipulated the requirements of beam No. 2, as they desired to establish the fact as to whether beams were at that time equal to all conditions.

The following beams were presented by their makers: The Marden steel brake beam, 2 specimens; the National hollow brake beam, 4; the Central steel brake beam, 4; the Westinghouse beam made by the Pennsylvania Railroad, 3; the Westinghouse beam made by the Pittsburgh, Cincinnati & St. Louis, 3.

The representatives of each of the beams were present at the test. None of the beams fulfilled the specifications with the exception of the National hollow, No. 4, which was entirely impracticable on account of its size and expense.

Subsequent to this a supplementary test was made at the request of some of the manufacturers of one Central steel beam, somewhat changed; one National beam constructed with two truss rods instead of one, thus preventing the necessity of cutting the compression member; four beams made by the Westinghouse Air Brake Co., and two Westinghouse beams made by the Pennsylvania, in which the compression member was changed in size and form. We would here state that all the Westinghouse beams were made of iron of rectangular section, the half-round section previously used having been abandoned.

All of the beams tested, with the exception of two of the Marden, four of the Central and two of the National would fulfill the specifications of beam No. 1. The beams fulfilling the specifications of No. 2 are Westinghouse Nos. 5 and 7 and National hollow Nos. 4 and 5. Appendix "A" gives all of the data and results in detail for each beam.

The Westinghouse Air Brake Co. have requested the committee to state on their authority that they will convey the right to use their beam to any railroad company using the Westinghouse brake. Your committee consequently feels that as this beam is public railroad property under the conditions named, it can speak more freely to the convention concerning it than of the other patented beams. Plans have, therefore, been prepared and are submitted herewith, showing Westinghouse beams designed to meet the requirements of No. 1 and No. 2. We will ask the convention to submit these beams to letter ballot for adoption as standards for all roads desiring to use the Westinghouse beam.

Your committee feel that it is incumbent upon them to recommend a particular form of beam for adoption at this time; however, as there is much merit in some of the other makes of beams, and they can all probably be made to meet the requirements of beam No. 1, your committee thinks that it would be ill advised to adopt the Westinghouse beam to the exclusion of all others. There is a strong preference among many of the roads for the other makes of beams, and there is a liability that invention and improvement would be arrested if the association attempted to restrict itself to one make.

Our recommendation, therefore, takes the form that all roads desiring to use the Westinghouse beam adopt the plan shown on sheet No. 4, and that all roads desiring to use the other makes of beams should stipulate that they meet the requirements of beam Nos. 1 or 2, whichever is used.

Your committee very strongly advise against the use of wooden beams either plain or trussed, as it is entirely impracticable to design them to meet the requirements of beam No. 1 without increasing their cost to fully as much as that of the iron beams, without gaining any of the durability afforded by the latter. The Baltimore & Ohio made exten-

TABLE OF BRAKE TESTS.

This table sums up the tests of iron brake beams made by the Master Car-Builders' Committee on Standard Brake Gear. The requirements were that the beams for passenger service should not deflect more than 1-16 in. under a load of 15,000 lbs., and for freight service they were to deflect not more than 1-16 in. under a load of 7,500 lbs.

Names of Beams.	Weight.		Deflections in inches.										Maximum load in pounds.
	Lbs.	Ozs.	Free.	3,000	6,000.	Set.	10,000.	Set.	12,000.	Set.	15,000.	Set.	
Marden No. 1	70	.....	00	.045	.095	.....	.16	.005	.195	.005	.255	.015	.....
" " 2	68	8	00	.04	.085	.005	.16	.005	.23	.04	.28	.04	.....
Central No. 1	69	.....	00	.048	.065	.....	.105	.015	.125	.015	.155	.025	31,500
" " 2	79	.....	00	.03	.07	.....	.11	.000	.13	.000	.17	.01	23,000
" " 3	72	.....	00	.025	.055	.....	.095	.015	.115	.015	.155	.025	30,570
" " 4	88	.....	00	.01	.04	.....	.08	.01	.11	.01	.14	.02	86,000
" " 5	87	.....	00	.03	.06	.....	.11	.03	.125	.04	.155	.045	42,950
National No. 1	46	8	00	.035	.05	.....	.09	00	.095	00	.12	00	25,350
" " 2	51	2	00	.03	.05	.....	.085	00	.10	00	.115	.01	28,000
" " 3	64	2	00	.01	.02	.....	.045	00	.06	00	.08	00	35,000
" " 4	100	.....	00	.01	.025	.....	.035	00	.045	00	.055	00	53,400
" " 5	99	8	00	.01	.02	.....	.04	00	.05	00	.06	00	47,500
P. R. R. No. 1	80	.....	00	.02	.04	.....	.065	.01	.08	00	.09	.01	37,300
* " " 2	72	.....	00	.02	.04	.....	.065	00	.08	00	.105	.01	34,000
* " " 3	69	8	00	.015	.04	.....	.065	00	.08	00	.105	.005	30,000
* " " 4	68	.....	00	.01	.03	.....	.055	00	.065	00	.09	00	36,200
* " " 5	66	.....	00	.01	.04	.....	.05	00	.07	00	.09	.01	27,500
P., C. & St. L. No. 1	64	.....	00	.01	.03	.....	.08	00	.....	.....	.11	00	27,000
Westinghouse No. 1	76	.....	00	.01	.03	.....	.07	00	.085	00	.105	.015	32,000
" " 2	88	.....	00	.01	.02	.....	.035	00	.045	00	.06	00	34,000
" " 3	78	.....	00	.03	.04	.....	.05	00	.06	00	.09	00	38,860
" " 4	79	8	00	.01	.02	.....	.03	00	.03	00	.06	00	38,700

* Westinghouse type.

REMARKS.—Beams were all bent in upper member but not ruptured, except the Central beams Nos. 1, 2, 3 and 4, which were torn through plate. P. R. R. beam No. 4 broke through lower member.

sive tests of wooden beams, and a statement of the results by A. J. Cromwell, Superintendent of Motive Power, will be found in appendix B. These results fully demonstrate the impracticability of the wooden beam.

Brake Shoes.—With the introduction of the iron beam it is possible to use a solid brake shoe, combining both the block and rubber in one piece. With a wooden beam the difficulties attending the attachment of such a shoe would render it impracticable for freight service. A solid piece fulfilling the functions of both block and rubber has many advantages over an independent block and rubber, as it reduces the number of parts on a car and is much less liable to be lost. With the solid shoe only one fit is requisite, namely, where it fits on the end of the brake beam. The beam can also be hung to better advantage. With the Westinghouse and Central beams the block and rubber can be either separate or combined. The Marden and National in their present construction require the block and rubber separate. For the reason that your committee considered it inadvisable to recommend the Westinghouse brake beam to the exclusion of all other forms, it is impossible for them to go further at the present time than to recommend a standard shoe for the Westinghouse beam when it is employed. This shoe is shown on sheet No. 4, and is of the solid form. Its circumferential face is 18 in. long, and it presents a wearing surface 30 per cent. greater than that of the present M. C. B. standard. The increase in length will reduce greatly the number of adjustments on account of slack and of replacements made necessary in service. It is very important that this shoe should be made of soft cast-iron, as that material affords the greatest frictional resistance when brought in connection with a car wheel. Cases have been brought to the attention of your committee where railroad companies seeking to save expense in renewals of rubbers have abandoned cast-iron, with the result that the brakes were reported inefficient and the brake or train-pipe pressure increased to restore the brake power.

The solid shoe recommended can also be employed on brake beams other than the Westinghouse when suitable changes are made in the ends of the beams.

While it is desirable that the length of rubber should be increased, your committee, for the sake of interchange of cars not provided with air brakes, would recommend for the present that in all cases where independent blocks and rubbers are used the rubber be made according to the standard form of Christy or Collin rubber adopted by the association.

It is possible that in the course of another year it would be advisable to recommend an increase in the length of the standard rubber. For the present, however, it would seem wise to leave this question with the large solid shoe above recommended for use with the Westinghouse beam and the Christy and Collin shoes for use on other beams.

Hanging of Beams is so intimately connected with the construction of cars that your committee have found it necessary to confine their recommendations to methods, leaving out of the question details. Whether it is better to suspend brake beams from the car body or the truck bolster, or from some point of the truck preserving a constant relative position to rail and wheel, great diversity of opinion exists, as is evidenced by the large number of cars in service having the brake beam suspended in each way. The advantages of hanging from the car body are that it brings the brake beams, levers, etc., in such a position as to facilitate repair, that there is more room for suspension in this manner and that the different parts do not wear so rapidly, owing to the fact that they are suspended from a point relieved by springs.

The advantages of suspending from the truck, where the point of support maintains a constant distance from rail and wheel, are that mechanically it is the more correct, that air brakes are more effective when brake beams are hung in this way, that there is less liability of sliding wheels when hand brakes are used and that the shoes have always the same relative position to the wheels whether on curves or tangents.

There is no doubt that with many of the present constructions of truck the arguments in favor of the first method are true, but your committee is of the opinion that trucks should in the future be constructed with proper allowance for attaching brake rigging, in which case all objections to the latter method would be disposed of.

The objections to hanging from the car body already implied are inherent in the principle and cannot be overcome in any practicable way. The most serious of the objections is that the shoes do not have a constant relative position to the wheel and rail, and when a car is under load the body with all its attachments is lowered, which increases the distance between shoe and wheel and thus increases the piston travel and reduces the effectiveness of the air brake.

In hanging from trucks of the ordinary passenger car truck type, or from the truck bolster, the objections are the same as when hung from the car body, except that the relative position of shoes to wheels is not affected by curves, and in passenger service the difference between light and loaded weight of car is comparatively so small as to make the depression of the body less serious. It is thought advisible that beams should be so hung that the centres of shoes will come just below the horizontal centre line of the wheels, and that no part of the brake gear should be lower than 5 in. from the top of rail. This will give the most satisfactory results and insure against the possibility of accidents to beams or other parts attached thereto.

With all of the beams tested except the Marden, there is a preponderance of weight on one side of the vertical plane of suspension which causes them to tip and permits the top of the brake shoes to rub against the wheels continually. It is difficult, if not impossible, to balance any beam from two points so as to prevent this entirely, but with the iron beams the difficulty is more aggravated than with the wooden, and it is the opinion of the committee that a third point of support should be provided at the middle of the length and extremity of over-hang to counteract the tendency referred to and insure the proper relative position of shoe to wheel. Drawings of the Westinghouse beams presented herewith show this and its usefulness is evident.

A Safety Attachment for holding beam if the hangers should break is recommended. The ordinary safety chain will not answer the purpose at all, as the continual rattling to which it is subjected wears it out in a short time and renders it worthless.

Levers.—As to the levers that are used in brake gear, it is obvious that if a brake beam is required to carry a definite load with not more than a given deflection, brake levers and all of the parts of the gear which are subjected to stress should be sufficiently strong to fulfill similar conditions of deflection under the respective loads that they are required to carry.

In order to determine the proper proportions of brake levers your committee had a series of tests made, and the proportions of truck and cylinder levers suitable for beam No. 1 were arrived at. It was first decided that all levers should be one inch in thickness, for the reason that a broad bearing surface is required at the connection to reduce wear and prevent lost motion, and further to facilitate interchange.

In determining the widths of the levers this uniform thickness of 1 in. was taken into consideration, and a truck lever of this thickness 30 in. long, to carry a load of 7,500 lbs. at a distance of 6 in. from one end, should be 2¼ in. wide at the ends and 3⅜ in. wide at the point of load. A cylinder lever of this thickness 36 in. long, cylinder connection 7⅝ in. from one end and a load of 4,500 lbs. applied at a distance of 9 in. from the latter point, should be 2⅛ in. wide at the ends and 3¼ in. wide at the point of load. These levers are shown on sheet No. 2, and should it be necessary to use levers of different lengths from these or levers where the distance of point of load from end varies from those given the proper widths can be calculated from these results as a basis.

Pins.—The pins used in making the connections of a brake gear, while seemingly of little importance, are worthy of careful consideration when considered in connection with the air brake. It has been the practice for a long time to use pins of from ½ to ⅝ in. diameter, forged, without regard to a good fit and lost motion of from $\frac{1}{16}$ to ¼ in. is no uncommon occurrence. The only thing required being sufficient strength. In an air brake gear, as before stated, it is most desirable to eliminate all lost motion possible, and inasmuch as the connections through the system of rods and levers are quite numerous, a little play in each is felt at the cylinder. Your committee therefore recommends that all the pins in the gear be made 1⅛ in. in diameter, turned, less $\frac{1}{64}$ in., to permit entering hole, and 3⅝ in. long under head, secured by a ⅝-in. cotter pin, as shown on sheet No. 2 of details. This large diameter is recommended to prevent wear; and while it may seem to some unnecessary and costly, especially to turn them, it is thought that it will more than pay in the long run. To turn these pins in large quantities in an ordinary way would undoubtedly be too expensive, but they can be had from manufacturers having tools for this purpose at a much lower cost than supposed.

The Hartford Machine Screw Co. makes a specialty of this class of work, and will furnish them at the following rates, the heads being unfinished: Ten cents each for small quantities; 9 cents each for 5,000 lots; 8 cents each for 10,000 lots.

Doubtless these prices would be further reduced when a demand was created, and other manufacturers might find it profitable to enter the business.

The rod clevises or jaws to be in good proportion with pins of the above size should be made of ¾ × 2½ in. iron, as shown by sheet No. 2. They should have holes accurately drilled to 1⅛ in. diameter, and twist drill preferred.

The Dead Lever Guide, by which adjustment of shoes to wheels is made and by which all lost motion should be taken up, is shown on sheet No. 2 in a form which your committee would recommend it. It is hinged from the truck, thus obviating the necessity of cutting a slot in the lever. The dead lever can consequently be made the same as the live lever and the necessity avoided of keeping a double stock of levers on hand. It is made of malleable iron, and should be of sufficient length to take up the entire wear of the brake shoes without adjustment at any other point. The bracket for dead lever guide shown on sheet No. 2 is only applicable to vertical channel bar trucks. It will have to be changed to suit other forms of trucks.

Bottom Connection of Truck Levers which transmits power from the live to the dead lever is subjected to either a compressive or tensile stress, according as the brake beams are inside or outside connected, and the form suitable to each condition is shown on sheet No. 2 as your committee would recommend them. That for inside connected brakes can be made most reasonably it is thought of malleable iron and the section of a cross shown in the drawings, would be most advisable. Malleable iron castings like this and the dead lever guide can be obtained at the prices paid for this class of car castings. That for outside connected brakes should be of wrought iron ¾-in. diameter as shown.

No allowance is made for the adjustment of brake gear or taking up of brake shoe slack by means of this connection. It is thought to be unnecessary and inconvenient to get at in many cases. It is recommended that all adjustment be made by means of the dead lever for which the guide shown on sheet No. 2 and previously mentioned is especially designed.

Brake Cylinders to be secured by ⅝-in. bolts, and the blocks to which the cylinders are attached should also be fastened by ⅝-in. bolts running through the sills. The number and location of bolts is shown on sheet No. 1 of the general arrangement. It is recommended that bolts be used wherever possible, in place of lag screws, as they are more secure.

Piping.—The train pipe should be uniformly 1¼ in. in diameter for freight service. It is most important that it be securely fastened, and to this end your committee shows, on sheet No. 2, the forms of clamps recommended. The location of pipe and clamp is shown on sheet No. 1, and are thought to be applicable to the great majority of cars. The pressure retaining valve pipe should be ⅜ in. diameter and is secured with staples as shown.

Precaution should be taken to make all pipe joints absolutely tight, and your committee would recommend that all pipes be tested under air pressure, and that a solution of soap and water be put around the joints at the same time, so that any leak can be detected by the formation of a soap bubble.

The importance of securing tight joints may be seen from the fact that two or three leaks in a train may seriously interfere with the operation of the brakes. A mixture of boiled oil and varnish, in proportion of one-half each, is recommended, in place of red or white lead, for making the joints air tight.

The Location of Train Pipe Stop Cocks is a point of considerable importance, and should be as nearly uniform as possible. As all freight air brake hose are of the same length, and as it is necessary that the hose between two cars when coupled should have sufficient dip to insure a tight joint at the coupling, your committee would recommend a standard location with reference to the top of rail, the centre line of the car and face of draw-bar, or inside of coupler hook when automatic coupler is used. The most suitable location for this on the vast majority of freight cars is shown on sheet No. 1, it being 13 in. from centre of car, and 13 in. from inside of coupler hook, or face of drawbar, to the centre of angle-cock key. The height from top of rail to centre of pipe should be 33 in.

The Location of Dummy Coupling is also important, as upon it depends largely the life of air brake hose. It should be in place and so attached that it is convenient to use, and at the same time prevent the hose from kinking when the air hose coupling is put in the dummy. The location recommended is shown on sheet No. 1.

The Release Valve and rods for operating it, by which brake cylinders and reservoirs are bled, should be located in such a manner that they will be convenient for use, and protected from accident as much as possible.

The Pressure Retaining Valve should be so located that it can be operated promptly by trainmen. Your committee recommend that it be placed on the end of the car having hand brake near the roof. It is important that it be well secured.

Your committee would respectfully submit the following standards for adoption by letter ballot:

1st. That the maximum train pipe pressure be 70 lbs.

2d. That the brake power exerted on all freight cars be 70 per cent. of their light weight.

3d. That the arrangement of the brake gear for the four conditions named be as shown on sheet No. 3.

4th. That the details as shown on sheet No. 2 be adopted, with all levers 1 in. in thickness. All pins be turned to 1⅛ in. in diameter with $\frac{1}{64}$ in. loss. All jaws or clevises to be ⅝ × 2½ in. iron. All rods to be ¾ in. in diameter, and all other details as recommended.

5th. That the position of train pipe cock and dummy coupling be as shown on sheet No. 1.

6th. That the brake beams for all present forms of freight cars be required to stand a stress of 7,500 lbs., with a maximum deflection of $\frac{1}{16}$ in.; and where it is necessary to use a stronger beam, that they stand a stress of 15,000 lbs., with a maximum deflection of $\frac{1}{16}$ in. Where the Westinghouse beam is employed, that the plan shown on sheet No. 4 be standard.

7th. That where independent brakes and rubbers are used, that the present standard Christy or Collin rubber be maintained. Your committee appreciates that the members of this association are fully alive to the necessity of establishing uniformity in brake gear for freight cars, to the end that not only the greatest facility in making repairs to cars be secured, but also that the brake equipment on a car will be as useful on a foreign as on a home road. It is believed, therefore, that it is unnecessary to urge by further argument the adoption of the standards recommended.

Your committee is under special obligations to Messrs. Vogt, Bayley and Bush for the very complete and thorough tests made of brake beams and levers.

Respectfully submitted,

EDWARD B WALL,
GODFREY W. RHODES,
GEO. HACKNEY,
} Committee.

CAR HEATING.

The committee on this subject reported having received 45 answers to circulars sent out. The answers represent an aggregate of 725 locomotives and 1,572 cars equipped with 12 different systems. We have summarized the replies in the accompanying table.

The committee points out the various well known difficulties of heating long trains, disposing of water of condensation, etc. An argument is made for the use of a double run of pipe because of the freedom from bends and pockets, and the inference from the report will be that the committee favors a return system. The committee concludes as follows:

"As your committee was appointed with special reference to a coupler for steam pipes between cars, which might be submitted for adoption as standard by letter ballot, this question has been given the most careful consideration, but from the preceding details it may readily be understood that the committee does not feel prepared to recommend any of the existing devices for a standard of the association in coupling these pipes, for we believe that the interests of steam heating generally will be better served by waiting a further development.

"Having formed this view of the case, your committee addressed a special inquiry to officers of the Pullman Palace Car Co. and the Wagner Sleeping Car Co., as parties representing cars most affected by lack of a standard in this respect, and both replied that they are not entirely satisfied with any of the devices yet brought to their attention. As neither of these companies is prepared to recommend any standard, and there is not any great interchange of passenger train cars outside of the sleeping and parlor cars, your committee recommends that the matter of standard coupler for steam pipes between cars be left open for another year, when it is hoped that additional experience will aid in a wise selection, and especially as the absence of such a standard need not materially hinder the application of steam heating appliances to 90 per cent., at least, of all passenger equipment cars.

" F. L. SHEPPARD,
R. D. WADE,
ROBT. MILLER,
Committee."

EXHIBITS.

In addition to the exhibits published in the *Railroad Gazette* of last week, in connection with the Niagara Convention, the following were also shown at Saratoga. The most notable exhibits were the steam-heating devices. All of the prominent companies showed working models with couplers.

Wright Mfg Co., 191 Berks St., Philadelphia. Pa.—Samples of Wright's Patent Fastening Device.

C. B. Hutchins & Sons.—Detroit, Mich.—Model of car roof.

Lehndorff Car Seat Co., Detroit, Mich.—Two seats and samples of springs.

Railway Lighting & Heating Co.—Catalogue of Frost Dry Carburetter System.

Russell & Erwin Mfg. Co., New Britain, Conn.—Full size passenger car door, showing their patent door check and spring.

New York Car Wheel Co., Buffalo, N. Y.—A 40-in. "machined" cast wheel, weighing 1,000 lbs., and balanced within 6 oz.

Cordley & Hayes, 173 Duane street, New York.—Samples of indurated fibre ware.

H. A. Luttgens, Paterson, N. J.—Model of a variable exhaust damper.

Revere Rubber Co., 63 Franklin street, Boston.—Samples of air brake and steam heating hose.

Fennell Automatic Freight Car Coupler Co., Skaneateles, N. Y.—Full size link and pin coupler.

Stephen G. Scott, Plainwell, Mich.—Model of tie truss for railroad joints.

Standard Car Coupling Co., 45 Broadway, New York.—Full size draw bar of the improved Dowling coupler.

The Thurmond Car Coupling Co., 45 Broadway, New York.—Full size draw bar of the Thurmond improved coupler.

The Gould Steam Forge and Automatic Coupler Works, Buffalo, N. Y.—Two cars at the Delaware & Hudson station equipped with the Gould antomatic coupler.

E. B. Arnold, Oriskany Falls, N. Y.—Model of a steel tie and model of a link and pin coupler.

The International Manufacturing Association, 10 Wall street, New York.—A model of the Morrell reversible trail deck sash.

Coburn Trolley Track Manufacturing Co., Holyoke, Mass.—Full size flush door for freight cars.

Johnston Electric Train Signal Co., Boston.—Model of electric train signal.

The Westinghouse Air Brake Co.—Iron brake beam and gear with blue points.

The Automatic Car Coupler Heating Co., Detroit, Mich.—The "Peerless" steam coupler.

Timms Car Coupler Co., Columbus, O.—Full size Timms automatic, cushioned car coupler; also the Timms patent journal box.

National Hollow Brake Beam Co., Chicago, Ill.—Full size hollow brake beam, also a beam taken from one of the Chicago & Northwestern Railway Co.'s coaches, having been in daily service two years.

Wakefield Rattan Co., Boston.—Car seats.

John Ballenden, Bloomington, Ill.—Pope's new excelsior lathe arbor and expanding mandrel.

Vulcanized Fibre Co., Wilmington, Del.—Dust guards.

SUMMARY OF REPLIES TO CIRCULAR OF M. C. B. COMMITTEE ON CONTINUOUS HEATING.

MARTIN SYSTEM; 141 LOCOMOTIVES AND 416 CARS EQUIPPED.

ROAD.	No. of cars heated in one train.	Pressure, Pounds. In train pipe.	Pressure, Pounds. In car.	Coupler.	Results.
Mich. Central	14	30	5 to 6	Martin.	Coupler unsatisfactory; system fair.
L. S. & M. S.	12 to 14	30	5	Martin.	Coupler unsatisfactory; difficult to regulate.
G., L., & S. and So. Central.	12 to 14	20 to 40	5 to 10	McElroy.	Satisfactory.
Northern Central	7	0 to 35	0 to 35	Martin.	Satisfactory except the coupler.
B. R. & P.	5	up to 50	up to 20	Martin.	Coupler unsatisfactory.
Fall Brook Coal Co,	3	10	.....	Martin and Gold.	Gold coupler satisfactory; Martin only fair.
Prov. & Worcester	4	20	4 to 20	Martin.	Coupler leaks.
Grand Trunk	5	20	10 to 15	Martin.	Coupler leaks badly.
SEWALL SYSTEM; 205 LOCOMOTIVES AND 295 CARS EQUIPPED.					
Old Colony	6	40	5 to 10	Sewall.	Good.
Fitchburg	12	15 to 30	5 to 10	Sewall.	Perfectly satisfactory.
Central Vermont	6 or 8	1 to 20	1 to 15	Sewall, etc.	Satisfactory.
Pullman (on Pennsylvania).	6	15 to 20	10	Sewall.	Fair.
Prov. & Worcester	5	20	5 to 20	Sewall.	Good.
Grand Trunk	4	20	10 to 15	Sewall.	Fairly satisfactory.
MCELROY SYSTEM; 90 LOCOMOTIVES AND 120 CARS EQUIPPED.					
D. & H. Canal Co.	12 to 15	.....	.....	McElroy.	Perfect satisfaction.
Pullman (on Pennsylvania).	6	10 to 25	8	Sewall.	Couplers fair; system not satisfactory.
NEW YORK, LAKE ERIE AND WESTERN SYSTEM; 102 LOCOMOTIVES AND 336 CARS EQUIPPED.					
Erie	7	10 to 35	0 to 20	McElroy.	Good.
LEHIGH VALLEY SYSTEM; 50 LOCOMOTIVES AND 160 CARS EQUIPPED.					
Lehigh Valley	14	20 to 40	5 to 10	McElroy.	Satisfactory.
NEW YORK SAFETY; 44 LOCOMOTIVES AND 93 CARS EQUIPPED.					
N. Y. & N. E.	7	30	.....	Westinghouse.	Coupler only fair; good.
CHICAGO, MILWAUKEE & ST. PAUL SYSTEM; 37 LOCOMOTIVES AND 76 CARS EQUIPPED.					
C. M. & St. Paul	6	5 to 30	5 to 30	Gibbs.	Very satisfactory.
BURLINGTON, CEDAR RAPIDS & NORTHERN SYSTEM; 28 LOCOMOTIVE AND 65 CARS.					
B., C. R. & N.	8	30 to 40	.....	B., C. R. & N.	Good.
EMERSON SYSTEM; 26 LOCOMOTIVES AND 41 CARS.					
Conn. River	9	20 to 40	5 to 10	Emerson.	Good.
GOLD SYSTEM; 20 LOCOMOTIVES AND 6 CARS.					
Pullman (on Pennsylvania).	6	20 to 30	10	Sewall.	Coupler only fair; system satisfactory.
STANDARD CAR HEATING AND VENTILATING CO.'S SYSTEM; 3 LOCOMOTIVES AND 16 CARS.					
Pennsylvania Co.	7	30	20	Standard.	Fair; some trouble with coupler.
PENNSYLVANIA RAILROAD SYSTEM; 1 LOCOMOTIVE AND 6 CARS.					
Pennsylvania R. R.	12	5 to 15	1	P. R.R.	Reasonably satisfactory.
NORTHWEST MODERN; 3 LOCOMOTIVES AND 3 CARS.					
C., St. P., M. & O.	3	5 to 30	5 to 30	N. W. Modern.	Very satisfactory.
ERIE CAR HEATING CO.'S SYSTEM; 1 LOCOMOTIVE AND 4 CARS.					
Pennsylvania Co.	4	40	20	E. C. H. Co.'s.	No trouble.

Dunham Manufacturing Co., Boston.—Model of Hix car coupler.

Over Stone, Flint, Mich., model of the Skinner automatic car coupler.

Geo. R. Meneely & Son, Troy, N. Y., journal bearings.

Merrill Bros., Brooklyn, N. Y.—Drop-forged turn buckles.

The Van Dorston Cushioned Car-Coupling Equipment Co., 308 Chestnut St., Philadelphia, Pa.—Full size car coupler.

The Robinson Car Coupler Co., Springfield, Ohio.—Full size link and pin coupler.

F. W. Bird & Son, Walpole, Mass.—Neponset rope roofing fabric.

Eureka Nut Lock Co., Marshall, Tex.—Samples of the Eureka Nut Lock.

The Elmore Car Axle Box Lid Co., Chicago.—Full size journal box lid.

The A. French Spring Co., Ltd., Pittsburgh, Pa.—The Morris steel box covers, adapted to various styles of boxes; made of rolled steel, pressed, and of cast spring steel; also several springs.

Michigan Railway Supply Co., Detroit, Mich.—Central steel brake beam.

The Consolidated Car Heating Co (successors to the Sewall & McElroy Co.s), Albany, N. Y., New York, Chicago and Portland, Me.—Couplers and blue prints for steam heating.

Westbrook & Cook, Port Jervis, N. Y.—Vertical plane M. C. B. coupler.

Gould-Tisdale Revolving Semaphore Co., Boston.—Full size electric semaphore, wired and in working order.

American Steel Car Wheel Co., Boston.—Car wheel.

Harrison Loring, Boston.—the Jewett freight car truck. Illustrated in the *Railroad Gazette* of June 14, 1889.

Curley & Bailey, Troy, N. Y.—Models of link and pin coupler and steam coupler.

Dreher Mfg. Co., New York.—Samples of Dreher's railroad compounds for lubrication.

Standard Thermometer Co., Peabody, Mass.—A fine display of thermometers, such as have been adopted by the Pennsylvania, Fitchburg, Boston & Albany and other roads.

Johnson Electric Service Co., Milwaukee, Wis.—Car heating and regulating apparatus.

Thomas V. Johnson, New York.—Samples of embossed leather.

The Safety Car Heating & Lighting Co., New York.—Coupler for heating; also, 16-section Wagner palace car lighted by the Pintsch system of compressed gas.

John H. Harrington, 17 Reynold street, New Bedford, Mass.—Coupler for steam heating.

Richmond Weather Strip Co., Richmond, Ind.—The Richmond weather strip for bottoms of passenger car doors.

G. Rainnie, St. John, N. B.—Safety appliance for car trucks.

The McConway & Torley Co., Pittsburgh, Pa.—Chart, showing the roads upon which the Janney coupler is in use.

Safford's safety draw bar, Phœnix Building, Chicago.—Safford's draw bar.

Marden Car Brake Co.—101 Milk street, Boston.—Marden's steel brake beam.

Bradley & Co, Syracuse, N. Y.—Models of the Bradley cushioned hammer.

The United States Car, Fire & Light Extinguisher Co., 54 Equitable Building, Boston.—Model of the Berry light and fire extinguisher.

Globe Ventilator Co., Troy, N. Y.—A dust guard for passenger car windows. The cars used on the excursion to Lake George, of the Delaware & Hudson Canal Co., were all equipped with this device.

Experiments on Seasoning Wood.

We present below a summary of some experiments on the natural seasoning of wood, made by Mr. G. H. Ellis, Chemist of the Chicago, Burlington & Quincy, at Aurora, and described by him in a report to G. W. Rhodes, Superintendent of Motive Power, which is printed in *Bulletin* No. 3 of the Forestry Division of the Department of Agriculture at Washington.

The specimens with which experiments were made consisted of oak and elm from Kentucky, hard and soft pine from Michigan, ash from Arkansas, and white-wood from Tennessee. The lumber was piled loosely, with cleats between the pieces, in a latticed shed, protected from rain but fully exposed to the air. Every Monday morning a piece 3 in. in length was sawed from each specimen, and in the centre of this piece a hole was bored, using a ⅝-in. bit. The borings or chips were immediately placed in a drying-tube whose weight was known; the tube was closed and the gross weight taken, after which the chips were dried in an air-oven for an hour, at a temperature of 230 deg. Fahrenheit, cooled and weighed. This was repeated, drying for 15 min. at a time, until the weight began to increase (probably on account of the oxidation of resinous constituents), when the lowest weight obtained was taken as the correct one. The following table, condensed from elaborate data given in the report, represents the general results of the experiments:

Percentage of Moisture in Air-dried Wood.

Date.	Oak.	Elm.	Pine.	Ash.	White-wood.
1887.					
Jan.	46.83-33.66	28.59-27.12	.....	22.60-19.79	16.21-14.31
Feb.	46.20-35.99	28.03-27.35	.....	22.59-22.37	15.89-15.03
Mar.	46.62-37.23	26.85-24.42	.....	21.67-21.02	15.54-15.32
Apr.	43.61-35.74	24.28-23.14	29.18-13.58	23.26-19.08	15.21-13.36
May.	41.85-36.55	22.91-21.69	28.61- 8.99	18.76-16.42	12.26-11.10
June.	45.44-33.11	21.58-20.16	25.19-10.06	16.34-13.91	12.47-10.49
July.	41.72-24.43	20.20-18.94	21.28- 9.43	13.31-12.61	11.34-10.46
Aug.	40.81-25.66	18.50-17.31	19.59- 8.64	13.15-11.32	11.56- 9.26
Sept.	40.67-23.77	16.93-16.25	15.84-10.16	12.23-11.18	11.11-10.35
Oct.	40.86-34.07	16.75-16.12	16.62-13.01	12.69-12.10	12.84-11.81
Nov.	37.11-30.26	16.25-12.70	14.94- 9.39	16.68-11.95	11.50- 8.39
Dec.	34.46-31.43	.....	15.12-13.09	13.03-12.70	.....
1888.					
Jan.	34.82-33.58	.....	16.32-14.00	13.71-12.69	.....
Feb.	33.30-30.66	.....	16.61-13.98	13.20-12.85	.....
Mar.	30.08-22.32	.....	16.65-13.43	12.57-	.....
Apr.	.....	.....	16.00-11.00	.....	.....
May.	.....	.....	15.90-11.71	.....	.....
June.	.....	.....	14.29-11.38	.....	.....
July.	.....	.....	14.42-11.25	.....	.....
Aug.	.....	.....	13.25-11.24	.....	.....
Sept.	.....	.....	12.70-10.84	.....	.....
Oct.	.....	.....	12.70-11.87	.....	.....

The foregoing table gives maximum and minimum amounts of moisture for each month in eight specimens of oak, four of pine, and one each of ash, white-wood and elm. The experiments were made at Aurora, and Mr. Ellis states that average Illinois weather prevailed. He draws the following conclusions: "1. That for oak the seasoning commences in March or April; with pine the exact month cannot be decided, as the specimens were not placed under observation until late (April), but all test pieces showed a loss of moisture within a fortnight after being exposed. Ash and white-wood commenced to lose moisture in April, and elm immediately on being exposed in January. No law can be deduced from the experiments as to the exact time that seasoning ends, as the woods all vary, but as a general rule it may be stated that in all woods (except perhaps elm) seasoning virtually ends with the end of the summer months.

"2. All woods take up moisture in slight amounts during wet weather of the fall and winter months.

"3. Pine of small dimensions (such as 1-in. flooring) will absorb moisture during the wet months. Other woods of small dimensions were not experimented with.

"4. As shown by these experiments, one season of average weather is generally sufficient to season wood for purposes of construction."

Notes on the Guatemala Central Railroad.

A special train on this narrow-gauge road, carrying the United States Minister to Central America, Mr. Lansing B. Wizner, recently made a remarkable run which is worthy of note, especially in view of the fact that the road is in such an isolated locality where it has no immediate competitors which tempt it to do great things and then modestly boast about them.

The train was made up of a small Baldwin wood-burning 8-wheel engine, No. 5, with 44 in. drivers and 12 × 16 in. cylinders. Engineer Morris was at the throttle. There were two cars, official car No. 5 and baggage car No. 15, and A. Pearce was conductor. They made the run of the first 14 miles, from Port San José, on the Pacific Ocean, to Navanjo water station, on the coast line, 10 ft. rise per mile on a mathematically straight line, in 17 minutes. The next 15 miles, from Navanjo to Escuintla, with maximum grades of 170 ft. per mile, in 38 minutes. From Escuintla to Palin, 12.8 miles, with grades of 285 ft. per mile, 83 minutes was the running time. From Palin to Moran, 17 miles, on an almost level grade, but over many 15 degree curves around Lake Amatitlan, 33 minutes. From Moran to Guatemala City, 13 miles, with grades of 147 ft. per mile, in 42 minutes. Making the whole distance of 71.8 miles in 3 hours 33 minutes, overcoming a summit height of 5,010 ft.

This included the slacking to a 6-mile gait over the seven large trestles. With the exception of the last 2 miles between the summit (water-divide between the Pacific and Atlantic Oceans) and the city of Guatemala, on a down grade of about 100 ft. per mile, the whole line from Port San José to the summit is on a rising grade, not an inch of elevation being lost in the location.

The scenery on this line is among some of the grandest on the continent, and the physical condition of the road is excellent. Its length is 70 miles, and in this distance it climbs a mile up in the air, and in one section of 12.8 miles rises 2,600 ft. There are seven high trestles, the longest being 400 ft. long and the highest 153 ft. high, and some of the grades are between 5 and 6 per cent., no switchbacks being employed. The rails are 50-lb steel, and the ballast is clean blue gravel and broken stone. Through the mountainous portion of the line the road is now being rebuilt on an entirely different location, reducing the maximum grade to 3 percent., which involves the lengthening of the line 3.8 miles. The road is well equipped and appointed. The principal engines are of the consolidation type, weighing 86,000 lbs., from Cooke Locomotive Works, Paterson, N. J. For the lighter grades of the coast line 22 and 25 ton eight-wheelers from Baldwin are used. This road is owned chiefly by railroad magnates and bankers of New York City, and has total annual earnings of about $7,000 per mile, operating expenses being 50 per cent.

TECHNICAL.

Bridges on the Louisville & Nashville.

The Louisville & Nashville will this year expend $350,000 for the improvement of its bridge service, and $215,000 for re-ballasting the track at all needed points to be hereafter decided upon. Ten or twelve of the smaller bridge structures, averaging in length from 40 to 200 ft., will be replaced by iron and steel bridges, and Chief Engineer Montfort is now deciding where the renewals will be made. Several of these smaller contracts have already been let to the Louisville Bridge & Iron Co., Louisville, Ky., the Detroit Bridge Co., Detroit, Mich., the Phœnix Bridge Co., Phœnixville, Pa., and the Shiffler Bridge Co., Pittsburgh, Pa.; of the largest structures, that across the Wabash River at Mount Vernon, Ind., on the Henderson & St. Louis Division, five spans, each 180 ft. in length, will be entirely re-built of iron and steel by the Detroit Bridge Co. Two bridges at Muldraugh's Hill, Ky., each 600 ft. long, will be renewed by the Shiffler Bridge Co., of Pittsburgh. At Rolling Fork, Ky., on the main stem, the structure will be of two spans, each 205 ft. long, and will be erected by the Phœnix Bridge Co. Across Licking River, on the Louisville, Cincinnati & Lexington Division, the same company will build the bridge of two spans, each 163 ft. long. The railroad company has already begun the masonry work, and the superstructures will be begun next week.

Fast Runs on the Reading.

Engine No. 1,012 of the Philadelphia & Reading recently took a train of heavily loaded passenger cars from Camden to Atlantic City, N. J., in 59 min. 40 sec., the distance being 60 miles.

After the recent test of the Strong locomotive on the Philadelphia & Reading, between Philadelphia and Bound Brook, on train No. 505 (the "two-hour" train), the regular engines were "let out," and the train sheet shows a number of excellent performances. Engine 206, John Hogan, engineer, made 13½ miles, from Hopewell to Weston, in 10½ min., equal to 77⅐ miles per hour. On June 20 engine 302, Engineer Butler, made 54.9 miles in 55 min. from start to stop, including a 1½ min. stop at Trenton Junction. These runs are, however, but little better than the everyday work on this train.

RAILROAD GAZETTE

Published Every Friday,
At 73 Broadway, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

As we go to press the convention of the Master Car-Builders' Association is in session at Saratoga. The attendance is much the largest ever known. It is estimated that the members, with their families and friends who are assembled there, number at least a 1,000. The most important business transacted so far is the revision of the rules of interchange, in which the convention spent two long and laborious sessions on Wednesday. No other business of great interest had come before the convention up to Wednesday night. The brake-gear report, which is printed in this issue, and the report on standard axle, are the most important matters to come before the convention after the rules of interchange, if, indeed, they are not more important.

We print in this issue an abstract of the report of the Committee on Car Heating. This has not been presented at the time of this writing, but it is expected that the discussion on it will be interesting. The significance of the information presented, so far as it can be said to have any significance, is much diminished by the fact that it represents the experience got from considerably less than half of the passenger stock fitted with continuous heating. Some of the lines that have used the system longest and most extensively are not represented at all in the committee's report.

The report of the American Society's Committee on Rails and Wheels is, as was suggested in these columns two weeks ago, in favor of a 12-in. top radius of head, an upper corner radius of $\frac{1}{2}$ in. and straight sides. It also recommends a radius of $\frac{1}{16}$ in. for the lower corner of the rail head and a head broad relatively to depth for sections of all weights. This does not amount to a specific recommendation of a more uniform distribution of the metal in the section, for, so far as it goes, it leaves the designer free to still put much more metal in the head than in the flange. Still, taken together with the summary made by the Committee of the arguments in favor of a better balance of the metal in the various parts of the section, this part of the report is substantially an indorsement of the theory of rail design which is expressed in the Michigan Central section, in a group of sections for several western roads which was shown in the *Railroad Gazette*, April 12, and in the sections proposed by Mr. R. W. Hunt, which we published June 7. The report has a weight much greater than it would have had merely as the expression of the opinions of the men who compose the Committee (weighty as their opinions are), for it sums up the opinion of a great majority of those who took interest enough in the subject to reply to the Committee's circular. It becomes almost certain, therefore, that the result of the discussion which has gone on recently is to be the prevalence, for some years at least, of a type of rail of which the Michigan Central standard is the example best known. It is possible, too, and indeed probable, that the variations in the individual designs will diminish, and fewer patterns of rolls will be required, to the great advantage of producer and consumer. There remains yet a great field for investigation before a set of standard sections can be properly recommended. The Committee advises that such investigation be set on foot, and we trust that this will be done. We should be surprised, however, if such unanimity of opinion is found as to the height, base and distribution of metal, in a section of a given weight, as has been found regarding the elements of design that the committee has already dealt with. Those elements which remain to be considered are more affected by variations in the condition of roadbed and in the weight and speed of traffic than those which have been so satisfactorily disposed of.

The cordial reception extended to the American engineers in England has exceeded expectation. Deference has been everywhere shown them. The reception and dinner in the Guildhall of London is an event of a lifetime, for but few of the English engineers have ever been honored with a reception in that historic place. The spirit shown by the English engineers in their welcome is worthy of careful consideration by the American. In each speech has been shown a high appreciation of the engineering skill of the visitors, and many are the expressions of feeling of kinship between the guests and hosts. This is complimentary to the American engineer, coming as it does from that nation which has the oldest scientific institutions and the largest amount of engineering plant and complicated structures, both on land and water, of all the nations of the earth. Such a testimonial ought to increase activity and patriotic feeling in our engineering societies. It should cause us to pay more attention to the papers read before our assemblies, and lead us to realize that our proceedings and our periodicals are quite as well read by the English engineer as his productions are by Americans. The visitors have found that recent papers read in America have already found their way to England, and their hosts are quite as conversant with the latest thought in the United States as the visitors themselves. The European engineer is a good and wide reader; his time is not so much occupied with the work of the moment as that of the engineer who is compelled to keep abreast of the tide of trade in the United States. All the American engineering periodicals of note are upon the tables of the English societies, and their bound volumes are to be found in the libraries. There is, moreover, evidence that careful attention is paid to our progress in engineering, and as a result of this the American engineers early in their journey are impressed with the conviction that they are being watched and have been watched with a critical eye, and it is most gratifying to find that they have not been found wanting in that ability and knowledge which command respect. A noticeable characteristic of the English workshops is their thoroughness of design. The aim seems to be first to make a drawing of a design which is exactly what is most desirable in its functions, and then, while preserving the whole function, to adapt the design to the tools and make such changes in the minor parts as will reduce the cost to a satisfactory amount. In reality, however, the steps are simultaneous, and in the mind of the English designer there seems to be an intention to keep the functions of the details of the structure of the machine ever uppermost and to subordinate the matter of cost to a degree which would strike terror to the hearts of American owners.

The unsatisfactory and slipshod state of discipline in the train service department of the average American road was well illustrated this week in the long delays to passenger trains at the Jersey City terminus of the Central of New Jersey on the day the new interlocking was first used there. Passengers by the hundred got out and walked a mile or so to reach the ferry. The signals are simple and admirably arranged, and the explanatory circular had been duly issued to the engineers, but they had not thoroughly studied it, and consequently nearly all of them were so slow and cautious that they hindered each other greatly. Those who were not cautious ran past signals with the temerity of a baby playing with a pistol, though, with the usual good luck, few switches were torn open. The simple trouble was, of course, that no one had seen that the engineers *understood* their circulars. Probably they signed the usual receipt reading "Order No. — received and understood." It would seem to be about time that intelligent superintendents take measures to explode this farce. An employé signing a statement which he does not fully mean or fully believe is encouraged to other breaches of discipline. It is, to be sure, not a specially easy task for an old engineer to study a complicated system of interlocking for the first time, but there should be a great improvement over the present state of things on most roads.

The difficulty between the Union Pacific and its engineers on the Leavenworth Division seems to be a question as to the terms of the contract between the road and the engineers agreed upon two years ago. It is stated that on account of the loss entailed each year by the operation of the three branch lines centering at Leavenworth, the company "set apart" these lines to be operated and managed as a separate organization from the Union Pacific Railway Co. proper. On May 15 the manager of the division made a reduction of the wages of the engineers and firemen on certain special runs, and now the grievance committee of the Union Pacific system claim that the road has no right to make a separate organization of these lines, unless the same wages are paid as on the Union Pacific main lines; that this change does not abrogate the agreement as to the rates of pay on the lines forming the new division. General Manager Kimball, on the other hand, maintains that the organization of the Leavenworth division, which is under independent management, has the right to manage its own affairs, and is not bound by the agreement of April 1, 1887. What the wording of the agreement is and what may be the status of the "independent management" does not appear, but it would certainly seem that an offer to leave the whole matter to arbitration covered every possible contingency, and so should be regarded as entirely fair. In offering to arbitrate the company is taking the ground laid down by President Adams in his recent *Scribner* article. This is only fair, as making practice correspond to preaching, but it is a refreshing novelty in this department of railroading. The need of a proper organization to carry out Mr. Adams' liberal policy is illustrated by the fact that the grievance committee in this case have to travel from Omaha to Boston in order to get at the men they wish to talk with. The Declaration of Independence should remind all railroad officers that the *method* of settling grievances is an important matter; access to the real authority should be quick and easy.

Our railroad law column this week has decisions touching upon a great variety of railroad work. Roadmasters as well as superintendents and other officers will be interested in several of the cases. "Shyster" lawyers seem to be plenty in the South as well as in other parts of the country, if we may judge by the extremely "cheeky" suits brought against the railroad companies down there for injuries to drunken men lying upon the track and people who walk upon the railroad on dark nights with their eyes shut, and expect engineers to stop and invite them to get out of the way. An Alabama decision, on a question of this sort, which was in favor of the railroad company, seems to have been given with reluctance. A Missouri case received more sensible treatment, the audacity of the claimant being sat down upon very summarily. In Indiana a superintendent seems to have offered the flimsy excuse that a certain employé's incapacity was unknown to him (the superintendent) personally; but the court very properly refuses to let him off on such a plea. Another superintendent seems to have made the absurd claim that a passenger on a train approaching a railroad crossing at right angles when a collision was impending should have had the quick wit to see the situation and signal the engineer to stop, but the court fails to approve the requiring passengers to possess such an intimate knowledge of railroading. The old case of the passenger who thinks he has reached the station, when in reality the train has stopped short of it on a high bridge, came up again in Pennsylvania. It would pay to have clear descriptions of a few cases of this kind printed in large type and framed for the use of trainmen who notify passengers to get off, and then afford them a first-class opportunity to alight in a dangerous place. Florida gives us two or three points of interest. The lawsuit about the ejection of passengers between stations would apparently have been avoided if the road had had a sensible rule about confining disorderly passengers in the baggage car until a station is reached. The verdict in the suit against a railroad for injuring passengers because it had a bad track is no doubt righteous, though one of the reasons given, that the rails were of irregular length (the broken one was 10 ft. long), seems somewhat illogical. Rails of any length, from 5 ft. to 40, ought to be safe, whatever may be said about the economy of irregular lengths.

The American Society of Civil Engineers.

One cannot attend a convention of the American Society of Civil Engineers without being impressed anew with the feeling that it is a great organization, and one that may produce and does produce most important results for its members, and for the whole country. Among the men who attend those conventions are some whose reputations are world-wide, and the questions discussed are often of great public interest. It is significant that the oldest and most eminent men are among those who take the most active part in the discussions which come up and in the investigation of matters of immediate interest. For instance, the failure of the South Fork dam is now under investigation by the President, a Vice-President and two Past-Presidents of the Society, and we are told that the latter gentlemen, men advanced in years and eminent in their profession, not only visited the scene of the disaster, under much personal discomfort, but carried the level, rod and tape line and made their own survey of the broken dam. The papers and discussions at the convention this year were of unusually high character, and there was no sign of waning interest in the society. Yet in spite of these evidences of the vitality of the society there has long been a feeling that its usefulness to its own members and its public influence are not as great as they ought to be and easily could be. This feeling has been growing, and this year has found expression in the revision of the constitution proposed by the members who have formed a subordinate organization, with headquarters at Cincinnati.

The obvious design of the proposed revision is, first, to prevent undue local control of the society, and second to secure efficient administration of its affairs. To secure the first end, the membership of the society is to be divided into districts and each district is to be represented on the Board of Direction and also in the Nominating Committee, which presents candidates for the various offices for each year. To secure the other object the Secretary, Treasurer and Librarian cease to be officers of the society, members of the Board of Direction and Trustees of the Society, but may or may not be members of the society. They are to be appointed, and their salaries are to be fixed by the Board. Moreover, the Secretary (who is also to be the Librarian) is to be paid in cash in full for all services, and is prohibited from "engaging in any other gainful occupation whatsoever." These are the most important of the proposed changes in organization. The number of the standing committees is increased and a Publication Committee is provided for, which shall examine and select matter for publication, subject to the approval of the Executive Committee. The requirements for membership are somewhat increased. These are all of the essential modifications in the present constitution. The appointment of a committee to consider a revision of the constitution and to take up also the question of closer relations with the various local societies insures for this very important matter some attention at the annual meeting.

On the whole, the most important of the proposed changes appear to be not only judicious, but eminently desirable. Whether or not there is now an undue local influence in the control of the society, and whether or not the proposed selection of the directors by geographical districts would correct such a condition, there should be no room for suspicion of sectionalism. The greatest good and glory of the society can only be attained when it is, in fact, and is acknowledged by all to be, the truly *American* Society, and not the Eastern or Western or New York or Chicago Society. Possibly some better means could be devised by which all sections and all interests might be represented in the board of direction than the proposed system of districting the country, but apparently that system would accomplish the end. One objection to it that is raised is that it would lead to deals and combinations by which the presidents would be elected as representatives of sections rather than as men of national reputation. This does not seem to be a serious danger, but it is worth considering before making any change in the fundamental law of the society.

Under any organization of the society the Secretary must be its executive officer. He must carry on the daily routine of the central office and do more of the work of the conventions and meetings than any other man. On him must depend greatly the availability of the library and collections of the society and the value of its rooms as a place of casual resort or for purposes of research, or as a general professional headquarters. To him especially the out of town members must turn for help in obtaining information and carrying on investigations. It will appear on reflection that the functions of the Secretary divide themselves naturally into two quite distinct classes. Those which concern only the members of the society directly and those which concern the relations of the society to other societies and to the profession at large. The duties of the first class will be best performed by a man who is diligent in study and correspondence, who is familiar not only with the great literature of the profession but with the library and collections of the society, and who has the patience and the inclination to learn a good deal about every individual member. The duties of the second class can best be performed by a man of high rank in the profession and of considerable social experience and address. Perhaps all the qualities of the ideal Secretary cannot be united in one man who could be hired for the salary which the society can afford to pay. Perhaps the solution of the problem is to be found in having an Honorary Secretary, who shall be an officer of the society, for one set of duties, and a salared Secretary, who shall be an employé, for the other. If, however, there is to be but one man, it seems probable that the most satisfactory arrangement will be something pretty nearly like what the Cincinnati Association proposes.

The Master Car-Builders on Brake Rigging.

The report of the Master Car-Builders' Committee on standard brake gear, which is published on another page, is by all odds the most important paper presented at the convention. It goes to the roots of the matter, and is sure to have a profound influence on future practice. The committee was well chosen. Its members have had much experience with the air brake, are familiar with the whole history of its development, and have given much study to all the conditions of its operation. The report which they present is on the face of it the result of much careful investigation. The care with which all the details of the subject have been considered will be fully apparent only when the drawings are published. It may be said here as an illustration that even the proper positions of the stop cock and dummy couplings were determined by considerable careful experiment.

The report will be a surprise to many, and undoubtedly it will take a good deal of time yet to convince the majority that such a fundamental overhauling of brake gear is necessary. Yet the report only puts in definite language ideas that have been taking shape for some time, and that have been the subject of much consideration by those intelligently interested in getting out of the air brake the service that it ought to give. The wonder is that those ideas have not been carried into general practice before now, but we believe that only one railroad in the country has so far undertaken to construct its brake gear with the sizes and proportions here recommended.

The report is so thorough that it leaves little to say that would not be a repetition of what the committee has said. Since the dimensions and proportions of all the parts which compose the brake gear in common use were established conditions have greatly changed. The weight and speed of cars have increased, particularly the weight. The quick-acting brake has come into use, but the dimensions of levers, pins, jaws and brake beams remain unchanged. With the growing requirements for brake power it has become necessary to increase the train pipe pressure or the leverages, or both. With the increase of pressure has come greater spring of the weak parts, from the brake beam back to the cylinder. The quick application of the power with the improved brake has had the same effect. The result of the spring of the parts, the increase of leverage, the slack from loose fitting and the lost motion from shoe wear and carelessness in fitting the shoes is that an important part of the piston travel is lost in taking up all this slack, and the full power of the brake is very often not available for stopping the train. It is by no means uncommon to find that the piston travels its full stroke without bringing any considerable pressure on the brake-shoes. This condition of things is not confined to freight service but is common to all classes of equipment, and to probably a large majority of roads. We have lately heard of one inspection point where 700 cars passed in one year with the pistons bottoming on the cylinders. It does not take much arithmetic to show what lost motion in any part of the brake gear means in brake travel; the important thing to remember is that a sixteenth inch of slack in the connections means several sixteenths of piston travel wasted.

But with weak foundation gear, increase of cylinder pressure only makes matters worse. To be sure the levers can be readjusted so that the piston will do its work with less travel; but then comes increased spring in the brake beams and connections, and the same circle has to be traveled around again. Moreover, the process of fudging with the pressure has resulted in evils, some of which have been pointed out by the committee. The leverage is too great, resulting in flat wheels, or too little, resulting in insufficient brake power. The general adoption of brake rigging, by which the full cylinder pressure will be useful for the proper purpose of the brake will make it possible to work with the standard pressure recommended.

The tests of brake beams are a valuable addition to the report. The results are summarized in a table which we print with the report. One immediate consequence of this investigation was a modification of one or two of the iron beams, one of them particularly having been straightened at little or no increase in cost. It was doubtless a surprise to the owners of the various iron brake beams to find how inadequate nearly all of them are to meet the requirements of the committee, yet it cannot be reasonably maintained that those requirements are too severe, and we hope that they will be adopted by the Association as standard. It is evident that a beam to fulfill them can be supplied of a weight and cost little if any greater than the wooden beam. The existing metal beams are adequate, if nothing better is devised, but we have not yet by any means seen the end of design in this direction.

Whatever may be the fate of this report in the Convention it will certainly have far reaching results. The dimensions and design of details which are recommended, the metal beam and the solid shoe will be made practically standard on various roads even if they are not made standard by the Convention. The importance of better brake gear is put before the roads in a definite way which will command attention. The economy of maintenance to follow the use of a well-designed brake gear, sufficiently strong to bear the strains that are brought to bear on it, will have more careful consideration than it has ever had before; and every one who has had much to do with car repairs knows how large a part of their cost is in repairs to brake rigging. On the whole, we congratulate the Association upon having produced a document which will add much to its technical reputation.

Duluth versus Chicago.

The problem of relative rates from the Northwest *via* Duluth and Chicago respectively is in some particulars a repetition of the old question between the different seaboard cities as to relative rates on export grain. St. Paul in the new problem takes the place of Chicago in the old; New York that of Liverpool; Chicago that of New York, and Duluth that of Baltimore. In each case there is a contest between a short rail combined with a long water route against a longer route by rail combined with a shorter one by water. The St. Paul & Duluth stands out for a large differential in favor of Duluth, just as the Baltimore & Ohio has so often insisted on the same privilege in favor of Baltimore.

Some years ago Mr. Fink pointed out the way in which ocean rates adapt themselves to rail rates. The rate from Chicago to Liverpool was substantially the same via New York or Baltimore. If the Baltimore rail route had a differential of three cents in its favor, the water charges from Baltimore to Liverpool would be about three cents higher than from New York. If the opening of canal navigation reduced the difference in inland rates, the difference in steamship rates was correspondingly reduced. The relative proportion which went by the different routes was far more affected by the facilities at the different ports than by the variation in rates of the railroad alone. The same experience has made itself felt at Duluth. The lowering of rates from St. Paul has accrued largely to the advantage of the Lake Superior boats. There has sometimes been such a heaping up of grain at Duluth that the steamboat owners have had a great temporary advantage, which has, to some extent, counter-balanced the railroad differential. The goods, which could go via Duluth, were limited in amount by the facilities for handling them after they got there.

There are two respects in which Duluth has more advantage in its contest with Chicago than Baltimore had against New York. In the first place, the Chicago roads are seriously hampered in the fight by the long

and short haul clauses of the Inter-state Commerce law. The loss on traffic from intermediate points which is involved in bringing St. Paul-Chicago rates near to the Duluth level is very great indeed. In the second place, the Baltimore route, both in its inland and in its ocean path, was under serious relative disadvantages from which the Duluth route is free. The heavy grades of the Baltimore & Ohio were an important offset to the advantage of distance. The difficulty of getting west-bound ocean freights from Europe for Baltimore was often a most serious disadvantage. It is doubtful whether the difference between Duluth and Chicago in this respect is as great as between Baltimore and New York. As for the difference in distance, that counts for less on a water route than in any other known method of transportation.

The relative advantages of the Duluth route are emphasized by the Eastern Minnesota, which virtually owns its boats and announces the intention of making lake and rail rates in which the charge from Duluth to Buffalo shall be no greater than that from Chicago to Buffalo; rates by which the Northern Minnesota region shall get the benefit of its greater nearness to Duluth. If it be true, as is claimed, that the cost from Duluth to Buffalo is no greater than that from Chicago to Buffalo, this state of things can be maintained indefinitely. As much of the Northern Minnesota freight can be diverted to Duluth as there are elevators to handle and boats to carry. Even if the Inter-state Commerce Law did not exist, the Chicago roads would find it difficult to resist this tendency. As it is, it will be almost impossible to do so.

Oil in Tank Cars.

This week the case of the Independent Refiners against the Trunk lines is set down for argument before the Inter-state Commerce Commission at Washington. Before the decisions of the Commission in the Rice and Schofield cases, the Pennsylvania and other carriers between the oil regions of Pennsylvania and New York bay made the same rate on oil per barrel, whether carried in tank cars or in wood. The decisions mentioned allowed Western railroads to include the weight of the wood in charging the same rate per hundred pounds upon oil in either kind of car, and, acting upon this, the Eastern carriers advanced the price upon barreled oil from 52 cents to 66 cents per barrel. The inference that the Commissioners had impliedly assented to this advanced was vigorously denied by them. The present action, now to be argued, is to have this rate of 66 cents in barrels reduced to the old standard rate of 52 cents, and also to get a ruling that rates on oil whether in tank or common cars shall be the same per barrel without including the weight of the wood. The first request involves the difficult question whether the Commission has the right to order a reduction of a rate which apparently shuts off a market. We do not think that the Independent Refiners can hope for a favorable decision here. Competition is supposed to regulate tariffs in this respect and would in this case if there were no other mode of conveyance except in barrels. In fact tank cars are cheaper and pipe lines cheaper still. Can the Commission say that oil in a particular form (*i. e.*, barrels) shall be transported at such a tariff that it can compete with oil in another form (*i. e.*, tanks) much more economical for the carrier? Or that either must be taken at pipe line rates?

As to the matter of relative cheapness of transportation between oil in tank cars and oil in barrels, some figures are interesting. As both kinds of cars weigh loaded about the same, it is assumed that an average train load would be 25 cars in either case. Then the calculation stands:

	Tank car.	Common car.
Capacity of car, bbls	120	80
Rate per bbl., cents	52	66
Capacity of train, bbls	3,000	2,000
Freight charges per car	$62.40	$52.80
Freight charges per train	$1,558	$1,320
Excess of train capacity, bbls	1,000	
Excess of revenue per train	$238	

The Pennsylvania Railroad, in transporting a trainload of oil to New York, has a selfish and proper interest in the mode of carrying. It loses $238, charges for its engine's full work when the oil is shipped in wooden barrels, and this even at the increased charge allowed for the wood. If we say that rack cars would perhaps number one or two more cars to the train than tanks, still the loss would be $130@185. If the charge per barrel were the same (52c.) the loss on our assumed train would be $520. It is true that this road did charge this lower rate on oil for years, but to make a loss of $500 per train compulsory by law is a serious matter. In this table nothing is said about mileage for the tank cars, it being supposed that it is balanced by the use of the car; but there is a loss even if the whole mileage payment were deducted from above figures. The consumers have an interest here, too, for this barrel train shows a loss in train capacity of 1,000 barrels. We are all anxious that our great staples should be carried at the minimum of cost and the maximum of quantity. Either to reduce the price to the public or to compete with the pipe line it is necessary that advantage be taken of the most economical transportation. A system which loses 1,000 barrels to the refiner and $200 or $500 in charges to the carrier stands condemned. If the Pennsylvania can make money on barreled oil at 52 cents, it can make an equal profit on tank cars at a lower rate. This lower rate on tank cars has so far been prevented by the agreement with the pipe line, which guaranteed to the railroad 26 per cent. of all the product of the oil regions.

The matter might not ever have called for judicial investigation but for the fact that the tank cars are mostly private property. The commission put its decisions in fact upon the ground that it is the duty of the carrier to furnish tank cars, or to give tank rates upon the oil in such cars as they may have. Probably no other decision was possible; but, nevertheless, it practically denies to the public the benefits which railroads could, and in the long run would, have granted through gradual cheapening of transportation and fall in rates. This would have come about through improvements in the tank idea, and from a better study into the economies possible to that form of carriage at sea as well as on land. It is, therefore, to be regretted that justice to the small refiners because of their inability to pay cash for tanks compelled the commission to give barrel rates to tanks or tank rates to barrels. It is hopeless to expect that all railroads will be able or willing to build and run a number of tank cars. Each one's interest in a line of special cars for special products is very small, and no law ought to compel any one road to put large capital in such an undertaking, or ask a number of roads to unite for such a purpose. What then shall be done? Manifestly it is for the interest of the public at large that such special cars should be used, and the only practicable way is for each road to pay to the owner a reasonable sum for the use of them. That the question of appropriate cars needs to be discussed at all is one of the drawbacks arising from independence, just as in the case of couplers, air brakes, etc. If the whole freight car equipment of the United States were put into the hands of one company, less cars would be needed, special cars could be built and despatched to different states as called for and order brought into the present complications.

As bearing upon the tank car matter, the present ruling upon cattle cars by the trunk lines may be noted. These have refused to haul private improved cars for cattle because their own inferior cars are standing idle. This is natural, but is exactly opposite to their position upon tank cars. The latter, they practically say, must be built by private owners, the cattle cars must not. Both these positions cannot be right. The present tendency is toward private ownership of cars specially adapted for certain traffic. The advantages of such cars are becoming more and more apparent. Their use raises new and troublesome questions, but doubtless these, like others, will be solved in time. In the oil matter the case is complicated, because the ownership of tank cars is in the hands of one company, the Standard. This and not private ownership of itself is the great difficulty.

May Accidents.

Our record of train accidents in May, given in this number, includes 45 collisions, 54 derailments and 3 other accidents; a total of 102 accidents, in which 52 persons were killed and 152 injured.

These accidents are classified as follows:

COLLISIONS:		
Rear	23	
Butting	18	
Crossing	4	
		— 45
DERAILMENTS:		
Broken rail	3	
Loose or spread rail	3	
Broken bridge or trestle	3	
Broken wheel	1	
Broken axle	6	
Broken truck	1	
Loose wheel	1	
Misplaced switch	5	
Rail out for repairs	1	
Cattle on track	2	
Landslide	2	
Accidental obstruction	1	
Malicious obstruction	1	
Sand drift	2	
Flood	1	
Unexplained	21	
		— 54
OTHER ACCIDENTS:		
Cylinder explosions	1	
Broken parallel or connecting rod	1	
Falling tree	1	
		— 3
Total number of accidents		102

The causes of collisions where given were as follows:

	Rear.	Butting.	Crossing.	Total.
Trains breaking in two	7	..	..	7
Misplaced switch	1	..	..	1
Failure to give or observe signal	..	..	..	..
Mistake in giving or understanding orders	..	7	..	7
Miscellaneous	9	..	..	9
Unexplained	6	11	4	21
Total	23	18	4	45

A general classification shows:

	Collisions.	Derailments.	Other.	Total.	P. c.
Defects of road	..	9	..	9	9
Defects of equipment	7	9	2	18	18
Negligence in operating	17	6	..	23	22
Unforeseen obstructions	..	9	1	10	10
Unexplained	21	21	..	42	41
Total	45	54	3	102	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other.	Total.	P.c.
Passenger	17	16	3	36	26
Freight and other.	63	40	..	103	74
Total	80	56	3	139	100

The casualties may be divided as follows:

KILLED.	Collisions.	Derailments.	Other.	Total.	P. c.
Employés	10	13	..	23	45
Passengers	3	24	..	27	51
Others	..	2	..	2	4
Total	13	39	..	52	100
INJURED.					
Employés	45	39	..	84	55
Passengers	12	51	..	63	42
Others	..	5	..	5	3
Total	57	95	..	152	100

The casualties to passengers and employés, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road	..	..	..	3
Defects of equipment	1	8	1	3
Negligence in operating	3	15	14	56
Unforeseen obstructions and maliciousness	23	40	4	11
Unexplained	..	..	4	11
Total	27	63	23	84

Nineteen accidents caused the death of one or more persons, and 35 caused injury but not death, leaving 48 (47 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with May, 1888 and 1887, shows:

	1889.	1888.	1887.
Rear collisions	23	32	18
Butting "	18	27	17
Crossing and other collisions	4	4	..
Derailments	54	75	43
Other accidents	3	7	5
Total "	102	145	83
Employés killed	23	23	16
Others "	29	20	15
Employés injured	84	59	40
Others "	68	99	33
Passenger trains involved	36	57	30
Average per day:			
Accidents	3.29	4.68	2.68
Killed	1.68	1.40	1.00
Injured	4.90	5.09	2.35
Average per accident:			
Killed	0.510	0.296	0.373
Injured	1.490	1.089	0.879

The Conemaugh Valley flood accounts for nearly all of the large number of passengers killed this month. The exact number of people lost from the three trains that were overwhelmed is still to be determined. Although as compared with the great disaster, as a whole, this is but an incident, it emphasizes the fact that the whole country should have had a very direct interest in the safety of the South Fork dam. Scores of people from many different states have passed through the dangerous locality daily for years. Only one other passenger was killed in a regular passenger train, that case being the derailment from a broken wheel at Cleveland. The three miners killed at Coalton, O., the 31st, were very likely classed as employés; but it would seem as though there had been about enough casualties of this nature to convince any superintendent who considers the matter of the necessity of taking good care of all persons who are taken into the cars of a railroad company. The pecuniary loss to a railroad company from the death of a workman averages small. Those whose heirs sue for damages and recover something (either by the aid of the law or through its perversion) being probably less numerous than those who make no complaint; but to the superintendent this should be a secondary consideration as compared with the damage to his own professional reputation.

Two of the bridge failures this month (and three of those in April) were caused by fire and the five deaths which were occasioned by one of them are clearly attributable to recklessness, an engine having been run upon a bridge known beforehand to be in a dangerous condition. Both April and May were marked by numerous bridge failures but the damage in most cases was apparently light and the trains must have been running slowly. Evidently the knack of operating a railroad with poor bridges poorly watched has come to be well understood on many roads. At all events we hear of no public agitation on the subject such as appears in the press of the West and Southwest when a railroad charges too high a rate on corn or cattle. The great majority of wooden bridges that are remote from human habitations are either watched by the section men or are approached by engineers with some caution; but when one not watched wrecks a train whose runner is not careful, the road and the runner seem to be held free from all blame. Somehow they reap the benefit of the general good average of safe trips that is made possible by the prudent conduct of others. A night express on the Chicago & Atlantic, near Lima, O., May 2, was stopped about 40 ft. before reaching a trestle which had burnt so badly that the rails were wholly unsupported. But engineers who make quick runs, on roads ex-

posed to such dangers as this, making up lost time, which nervous passengers greatly begrudge, doubtless receive more praise than do those who, like the one in this case, take the safe side and shut off steam when they see what may be a tramp's camp or a grass fire.

Seven mistakes in orders are recorded for May. One of them is explained at some length. In both it will be seen that the necessary remedy must be a very comprehensive one, involving continued attention to numerous details of the telegraph department. The Springfield *Republican*, in discussing the collision at Trumbull, Conn., the 28th, demands that the negligent operator or dispatcher be punished to the extent of the law. It assumes that running trains by telegraphic orders affords "almost perfect" security, provided those intrusted with the operations are ordinarily faithful. It might have omitted the "almost," for the *system* is quite perfect; but "ordinary faithfulness" may be a relative term. A ten-year-old boy who takes the liberty to alter an order, as was done in the case of the disastrous collision at Crystal Springs, Dak., on the 5th, might perhaps be credited with ordinary faithfulness. The trouble there, whether the operator was ten, twenty or thirty years old, was doubtless inexperience; the danger of guessing even at a single letter or figure was not realized. The faithfulness of the superintendent who appoints inexperienced or morally weak operators may, however, be questioned; and the manager who permits anything but the strictest and most complete system to be used in his dispatching office should also ask himself whether it will be himself or his subordinates that will be responsible in case of collisions resulting from mistakes in orders. In case of trouble he will be tempted to place upon *them* all the blame, when it perhaps should be shared by himself; the rational method for *him* to pursue would be to provide such a good system and take such pains to impress upon subordinates the nature of their duties that it would be wholly impossible to throw any part of the responsibility back upon headquarters.

The Pennsylvania suffered a considerable fire loss by reason of a brakeman's lantern setting fire to a tank car loaded with benzine. Escaping gas or leaking liquid appears to have come in contact with the flame. A passenger was thrown off "by a lurch of the train at a curve" at Paradise, Pa., May 18, while attempting to pass from the smoker to the Pullman car. Probably every passenger thrown from the platform of a moving passenger car is chargeable with more or less carelessness and therefore does not deserve the consideration that is due to passengers in most casualties; but notwithstanding this a death or injury from that cause is deplorable and calls attention to the merits of the vestibule. On the Mexican National a train of 24 cars was wrecked and two men killed by running over a hand car. At Dorval, on the Grand Trunk of Canada, a local freight train standing at the station was simultaneously run into at both ends, all three trains being completely wrecked.

It has been stated in some of the newspapers that the Johnstown bridge, which withstood the tremendous strain of the flood and accumulated wreckage, was so damaged as to imperil its stability. Mr. Becker, Chief Engineer Pittsburgh, Cincinnati & St. Louis, and President of the American Society of Civil Engineers, said, in the course of the discussion on the South Fork dam, at Seabright, last Saturday, that the bridge was not seriously damaged by the flood, but that there are some superficial cracks in the masonry, caused by the heat from the burning wreckage. The bridge is built to carry four tracks, and is 50 ft. wide. Some of the coping was somewhat displaced, but otherwise there is no rupture or displacement of the structure.

English machine shops make extended use of a tool which is but little used in America. It is a band saw for metals. Its construction is similar to that of a heavy band saw, with a third carrying wheel for the saw, the object of which is to remove the up-moving side of the blade from the vicinity of the table, and thus leave a deep throat through which a large piece of work can be passed or a wide plate turned. This third wheel is placed at the back of the machine, about midway in the vertical height of the saw blade. The temper of the saw is slightly harder than that of those used for wood. The teeth are sharpened straight across the blade by a cutter, with its teeth at the right height to suit the teeth of the saw blade. This tool is used to cut off the spines from steel castings, the ends of bolts, to saw up steel, iron and copper plates to any form and to rough out the jaws of eccentric rods and other forgings which would require the use of slotting machines. It cuts as well on a circle as upon a straight line. The blade is lubricated with soap and water, and in a cut 6 in. long through a steel connecting rod jaw it works freely and satisfactorily. Not infrequently circular saws of large dimensions are used for the same purpose, and, being mounted on heavy frames and fed carefully up to their work, cut off large pieces of steel, leaving a nearly smooth surface on the face of the cut. A saw similar to the above is now in operation at the shops of the Yale & Towne Mfg. Co., at Stamford, Conn.

The Baltimore & Ohio, which has been for many years made its own car wheels, closed the foundry at Mount Clare last week, and will in future purchase its wheels from outside manufacturers. It is said that wheels made in the company's foundry cost a few cents each more than other manufacturers' prices, and also that there has recently been complaint of the wheels not giving the service they should. An order has been given to the Lobdell Car Wheel Co. for a large number of wheels. The road has been making large reductions in the shop forces, and the closing of this foundry throws 75 more men out of employment. It is stated that the shops have heretofore made about 50,000 car wheels per annum. Reports as to the plans of the company are conflicting, but it looks as though the intention was to devote the Mount Clare shops chiefly to repair work.

The Texas legislature, in considering railroad affairs, "got its back up" to such an extent that a law was enacted compelling the head offices of certain railroads to be located within that state, and the roads controlled by the Southern Pacific Co. will have to adjust themselves to the change by July 6. It is stated that the various Texas roads of this system will be operated under their original names. General Manager A. C. Hutchinson remains at New Orleans in charge of the roads in Louisiana and the steamers, while Mr. Kruttschnitt, his Assistant, will go to Houston, and become Vice-President and General Manager of the lines in Texas. It is probable that quite a share of the large clerical force at New Orleans will also have to move.

NEW PUBLICATIONS.

Manual of Instruction in the Principles of Prompt Aid to the Injured. By Alvah H. Doty, M. D. New York.

This book is thoroughly well adapted to its purpose. When its 217 small pages have been carefully studied the reader feels well equipped for emergencies—for affording temporary relief to sick or injured persons. The first 67 pages give a concise description, with appropriate illustrations, of the anatomy and physiology of the human body and the functions of the different organs. This portion of the book is so well done that after reading it carefully any intelligent person should be able to locate a broken bone or find and compress a severed artery. The chapter on bandages is peculiarly attractive to any one interested in knots and deft manipulation. The engravings showing bandages applied to all parts of the body cause one to long for an accident and an occasion to use the newly-acquired information. The proper treatment of fractures and wounds with such appliances as may be ordinarily had is well shown, as is also the various means to be improvised for transporting a wounded person. The better known methods of resuscitation from drowning are, of course, not omitted.

Attention is called to this manual in order to suggest the advisability of supplying such information to conductors and brakemen. Every conductor ought to be able to pass an examination based on this book, and it might be well to require them to do so. Lectures before Railroad Y. M. C. A.'s have done much good in this line, but a manual could supplement the somewhat ephemeral impressions there gained with more definite knowledge.

TRADE CATALOGUES.

National Switch & Signal Co., South Bethlehem, Pa.—This new concern has issued a brief pamphlet (which is characterized as merely a preliminary announcement) showing cuts of various details of the interlocking machines and other railroad appliances made by the company. Among others are a vertical locking frame and vertical detector bar. The latter has been recently improved, and is now in such a form as to admit of the easy operation of a large number of bars by one lever. The Koyl parabolic semaphore, now controlled by this company, is shown. One of these signals is now in use on the Manhattan Elevated, New York City. The National torpedo signal (formerly Palmer's) is now controlled by this company, and is shown in sectional drawings.

Train Accidents in May.

COLLISIONS.

REAR.

2d, on Philadelphia & Reading, near Ashland, Pa., freight train broke in two and the rear portion ran into the forward one, wrecking 5 cars.

2d, on Wisconsin Central, near High Bridge, Wis., passenger train ran into a preceding freight train. Engine and caboose damaged.

2d, on New York, Lake Erie & Western, near Hancock, N. Y., a fast freight train ran into the rear of a construction train, throwing the caboose and a coach containing employés over an embankment into the Delaware River, injuring 10 men.

3d, on Milwaukee, Lake Shore & Western, at Cedar Grove, Wis., a freight train ran over a misplaced switch and into some cars standing on a side track. Engine and several cars damaged.

4th, on Brunswick & Western, near Riverside, Ga., a construction train ran into the rear of a freight train, wrecking engine, caboose and 5 cars. The freight had stopped to pick up a man who had been run over by the train.

4th, on Central Vermont, near Roxbury, Vt., a freight train broke in two and the rear section ran into the forward one, badly wrecking 10 cars loaded with hogs, killing many of them.

5th, on Boston & Albany, near North Grafton, Mass., a freight train broke in two, and the two portions collided, wrecking 3 cars and derailing several others.

5th, on Pennsylvania, near Columbia, Pa., a freight train ran into a preceding freight. One car was thrown over an embankment, and the caboose caught fire and was destroyed.

7th, on Cincinnati Southern, at Rockwood, Tenn., freight train broke in two and the two portions collided, ditching 4 cars.

7th, on New York & New England, at Towner's, N. Y., a freight train broke in two and the rear section ran back into a following freight, damaging an engine and several cars.

8th, on Chicago, Milwaukee & St. Paul, at Dell Rapids, Dak., a freight train running at speed struck a box car, which a gale had blown from a siding on to the main track, and was badly wrecked. One trainman killed, several injured.

8th, on Wabash road, in St. Louis, Mo., a yard engine collided with some freight cars, killing a fire man.

10th, on New York, Lake Erie & Western, near Port Jervis, N. Y., a west-bound freight train which had stopped to repair a broken coupling was run into by a following freight just as it was about to start again, damaging an engine, caboose and several cars. Two trainmen injured.

13th, on Baltimore & Ohio, near Monrovia, Md., a freight train broke in two and the detached portions collided, damaging a number of cars.

15th, on Union Pacific, near Beatrice, Neb., a mixed train broke in two and the rear portion ran into the forward one, wrecking several cars. A passenger and an employé in the rear car were injured.

16th, on Baltimore & Ohio, near Hagerstown, Md., an excursion train ran into some freight cars left standing on the main track, doing considerable damage. One passenger injured.

17th, on Pittsburgh & Western, near Mahoningtown, Pa., a freight train ran into the rear of a preceding freight, wrecking engine, caboose and 4 cars. Two trainmen injured.

20th, on Philadelphia, Wilmington & Baltimore, near Charlestown, Md., a south-bound freight train ran into a preceding freight which had stopped on a curve to cool a hot box, wrecking engine, caboose and 8 cars. Engineer injured.

25th, on Cincinnati, Indianapolis, St. Louis & Chicago, at Delphi, O., an express train ran into the rear of a freight train, doing considerable damage. One trainman injured.

25th, on Southern Pacific, near Luling, Tex., a west-bound freight train collided with a light engine. Both locomotives and 3 cars wrecked. One of the engineers was caught in the wreck and killed, and the other was severely injured.

25th, on Central of New Jersey, in Plainfield, N. J., a freight train ran into the rear of another freight which had just come to a stop. Engine, caboose and 12 cars wrecked. Two trainmen injured.

25th, on Richmond & Petersburg, near Richmond, Va., a passenger train ran into the rear of a freight train going on to a side-track, several cars of which had not cleared the main track. Several trainmen injured.

28th, on Pennsylvania, near Christiana, Pa., a freight train ran into the rear of a construction train, wrecking an engine and 10 cars.

BUTTING.

2d, on Northeastern, near Hillsdale Station, Miss., butting collision between two passenger trains, doing some damage. Two trainmen injured.

4th, on Philadelphia & Reading, near McCaull's Ferry, Pa., butting collision between two freight trains, damaging both engines and several cars.

5th, on Northern Pacific, near Crystal Springs, Dak., butting collision between a west-bound passenger train and an east-bound freight train, wrecking the engine and a portion of each train. Two trainmen killed, 2 injured. The cause is explained by the Superintendent as follows: The collision occurred through the scratching of an order at Steele. The trainmen, contrary to rule, accepted the scratched order. The order read: "Meet second section No. 1 at Windsor," and was repeated back all right. The operator copied the order, "Meet sections No. 1," and then subsequently, thinking probably the order was not complete, inserted the word "first," and made it read, "Meet first section No. 1 at Windsor." The two sections of No. 1, which is the through overland train, were running thirty minutes apart, and the freight train, according to previous orders, was to have met the first section at Crystal Springs and then to have pulled on to Windsor, five miles further east, to meet the second section. The freight trainmen accepted the doctored order from the Steele operator, and, instead of waiting at Crystal Springs for the first section, were going to Windsor to meet it when the collision occurred.

6th, on Pennsylvania, near Columbia, Pa., butting collision between two passenger trains, damaging both engines.

6th, on Arkansas & Louisiana, near Ozan, Ark., butting collision between a passenger train and a construction train. Both engines damaged, one trainman injured.

9th, on Central of New Jersey, near Califon, N. J., butting collision between two freight trains, due to the negligence of an operator. Both engines badly damaged, fireman killed.

7th, on Delaware, Lackawanna & Western, at Port Oran, N. J., butting collision between a freight train and a yard engine, due to an operator's mistake. Engineer badly injured.

8th, on Cincinnati Southern, near Glen Mary, Tenn., butting collision between passenger train No. 2, behind time, and a freight train, wrecking both engines and derailing the forward portions of each train. One trainman killed and 3 injured. An order was issued giving all trains 5 hours and 15 minutes of the time of No. 2, but the copy given to the freight trainmen read 5 hours and 50 minutes.

12th, on Philadelphia & Reading, at Norristown, Pa., butting collision between two freight trains, doing some damage.

13th, on Arkansas & Louisiana, near Nashville, Ark., butting collision between a passenger train and a freight train, wrecking both engines and several cars. The freight was running contrary to orders.

14th, on Jeffersonville, Madison & Indianapolis, near Henryville, Ind., butting collision between two freight trains, due to the negligence of an operator, both engines and a number of cars being damaged.

14th, on Southern Pacific, near Los Angeles, Cal., butting collision between a special passenger train and a freight train. One passenger injured.

15th, on Southern Pacific, at Niles Station, Cal., butting collision between a passenger train and a freight train, wrecking both engines. One passenger injured.

18th, on Illinois Central, at Duquoin, Ill., butting collision between two engines bound for a water tank. The engines were deserted before the collision. The throttle of one of the locomotives was opened by the shock, and it started and ran back some distance and collided with a yard engine, wrecking both.

28th, 4:30 a m., on Housatonic road, near Trumbull, Conn., butting collision between a special north-bound and a regular south-bound freight train, piling up the forward portions of both in a very bad wreck. Two trainmen killed, 2 injured. The accounts indicate that the operator at Stepney, a station north of the point of collision, had an order to hold the south-bound train, but he either accepted the order after the train had passed him or else failed to deliver it, the train having passed him without stopping. The coroner's jury, however, lays the blame upon the dispatcher.

30th, on Burlington & Missouri River, in Lincoln, Neb., butting collision between two freight trains, wrecking both engines. Fireman killed.

31st, on Dayton, Fort Wayne & Chicago, near Coalton, O., butting collision between two freight trains, one of which was being pushed. At the front of this train was a caboose containing 30 miners, all of whom were somewhat injured. Three were killed and 7 badly hurt.

31st, on Georgia Pacific, at Columbus, Ga., butting collision between a switching freight and a yard engine, damag-

ing both engines and 2 cars. A man in charge of stock was injured.

CROSSING AND MISCELLANEOUS.

15th, at the crossing in East Birmingham, Ala., collision between Louisville & Nashville and Columbus & Western freight trains, damaging two engines and five cars.

16th, on Pennsylvania, near Ormsby, Pa., freight train backing onto a side track collided with a work-train, wrecking several cars. Eight laborers on the work train were injured.

16th, on New York, Lake Erie & Western, in the tunnel at Jersey City, N. J., an express train ran into a freight switching on the main track, derailing two cars of the latter.

30th, on Long Island road, at a crossing at Manhattan Junction, N. Y., an empty passenger train was backed into the rear car of a passenger train which was approaching the station, damaging two cars, one of which was partly overturned.

DERAILMENTS.

DEFECTS OF ROADWAY.

1st, on Union Pacific, near Green River, Wyo., 13 cars of a freight train were thrown from the track by a broken rail and wrecked.

1st, on Chicago & Alton, at Bowling Green, Mo., 7 cars of a freight train were thrown from the track by a broken rail and wrecked. Tramp killed.

3d, on Cleveland, Lorain & Wheeling, near Maynard, O., a bridge gave way under a freight train, all but the engine going down with it. Three trainmen injured.

6th, on Chicago & Northwestern, near Peshtigo, Wis., freight train thrown from the track by the spreading of the rails. Fire broke out and 13 cars were consumed.

7th, on Cincinnati Southern, at Dayton, Tenn., freight train thrown from the track by a broken rail, wrecking 4 cars.

14th, on Santa Fe Southern, near Espanola, Col., engine and tender of a passenger train broke through a burning bridge in a deep cut on a curve.

18th, on Nashville, Chattanooga & St. Louis, near Nashville, Tenn., a bridge over Stone River, which had been fired by sparks from a passing train, gave way under a locomotive sent out with a number of laborers for the purpose of extinguishing the flames, and fell into the stream below, a distance of about 40 ft. Engineer, fireman and 4 laborers injured and 5 laborers killed.

33d, on Missouri, Kansas & Texas, near Waco, Tex., freight train thrown from the track by the spreading of the rails, damaging several cars.

30th, on Baltimore & Ohio, near Rockville, Md., engine and forward cars of a passenger train thrown from the track by the spreading of the rails.

DEFECTS OF EQUIPMENT.

2d, on Pittsburgh, Fort Wayne & Chicago, near Park Manor, Ill., 13 cars of a freight train were derailed and ditched by the breaking of a truck, 4 of them being completely wrecked.

8th, on Valley road, at Cleveland, O., the smoking car of a passenger train, running at speed, was derailed by a loose wheel and hurled against a coal car standing on a siding. One side of the smoker was demolished, killing 1 passenger and injuring 7 others.

15th, on Keystone Lumber Co.'s road, near Brookhaven, Miss., 3 cars of a freight train were thrown off a trestle by the breaking of an axle. One employé killed, 2 injured.

17th, on Chicago, Rock Island & Pacific, near Bremen, Ill., 25 cars of a freight train were derailed and badly wrecked by the breaking of a journal. Fire broke out, and the wreck was consumed.

18th, on Central Pacific, near Bakersfield, Cal., a wheel broke under a coach in a passenger train, derailing it and the preceding baggage and express cars, all three being badly damaged. One trainman injured.

18th, on Boston & Maine, at Salem, Mass., axle of forward truck under a parlor car of a passenger train broke, tearing the truck to pieces and letting the car body fall upon the rails. A passenger at the rear end of the preceding car got frightened on seeing the end of the car go down, jumped off and was seriously injured.

24th, on Grand Rapids & Indiana, near Plainwell, Mich., 9 cars of a freight train derailed and wrecked by the breaking of a journal.

27th, on Ohio, Indiana & Western, near Bloomington, Ill., 12 cars of a freight train derailed by a broken axle.

29th, on Philadelphia & Reading, at Auburn, Pa., freight train derailed and wrecked by the breaking of an axle.

NEGLIGENCE IN OPERATING.

3d, on Canada & St. Louis, at Shepshewana, Ind., engine and forward car of passenger train derailed by a misplaced switch. Engineer injured.

7th, on Louisville & Nashville, near Erin, Tenn., engine and 2 cars of a freight train derailed by a misplaced switch.

13th, 10 p. m., on Brooklyn, Bath & West End, at Unionville, N. Y., a passenger train ran over a misplaced switch, and dashed into a round house, badly damaging 3 locomotives and the building. One trainman injured.

24th, on Southern Pacific, near Glidden, Tex., freight train derailed by a misplaced switch. The engine was overturned, and one car wrecked. Engineer injured.

30th, on Cincinnati, Hamilton & Dayton, at Perrysburg, O., passenger train derailed by a misplaced switch, the engine being overturned, and 2 coaches damaged. Two trainmen and several passengers injured.

30th, on St. Louis, Arkansas & Texas, near Helena, Ark., an engine and several cars of a freight train were derailed and tipped off a trestle which was undergoing repairs, several rails having been removed. Three trainmen injured.

UNFORESEEN OBSTRUCTIONS.

8th, on Northeastern, near Hattiesburg, Miss., a passenger train ran over some cattle, derailing the entire train. The engine was overturned in the ditch, and several cars were damaged. Four trainmen and 3 passengers injured

10th, on New York, Lake Erie & Western, near Port Jervis, N. Y., a freight train ran into wreckage thrown over from the opposite track, doing some damage.

10th, on Eastern of Minnesota, near Hinckley, Minn., freight train ran over some cattle and 16 cars were derailed and badly wrecked. Two trainmen injured.

13th, on Union Pacific, near Bailey Station, Col., engine of switching freight train ran into a boulder which had rolled down upon the track, and was derailed and overturned in the ditch. The fireman was caught under the engine and burned to death.

15th, on Atchison, Topeka & Santa Fe, near Winslow, Ariz., engine and several cars of a passenger train derailed by a sand drift.

16th, on Atchison, Topeka & Santa Fe, near Hauck's Tank, N. M., freight train derailed by a sand drift and wrecked. Two trainmen killed, two trainmen and two drovers injured.

22d, on Denver & Rio Grande, near Gray's Siding, Col., an empty engine was derailed by a boulder which had rolled down upon the track. Engineer and fireman injured.

23d, about 11:30 p. m., on St. Louis & San Francisco, near Sullivan, Mo., passenger train was derailed at a point where rail fastenings had been maliciously removed. The tender and baggage car went over an embankment and several coaches were badly damaged. One trainman and 35 passengers injured,

31st, afternoon, on Pennsylvania road, at Conemaugh, Pa., three passenger trains detained at the station by washouts were overwhelmed by the flood in the river from the broken South Fork reservoir and some of the cars were carried down stream. The passengers and trainmen were warned of the danger by the whistling of the engine of a work train rushing down the valley ahead of the flood, and had barely time to escape. Some who hesitated or lingered were drowned; the exact number is not known, but it is estimated at 23 passengers and 1 trainman.

UNEXPLAINED.

2d, on Kansas City, Memphis & Birmingham, near Birmingham, Ala., engine and 9 cars of a freight train derailed and ditched.

5th, on Philadelphia & Reading, near Telford, Pa., freight train derailed and partially wrecked. Engineer and a tramp injured, and 1 tramp killed.

6th, on Maine Central, at Orono, Me., 3 platform cars of a freight train were derailed and wrecked. A brakeman on one of them was thrown into a river, but escaped without injury.

7th, on Pittsburgh, Cincinnati & St. Louis, near Miamiville, O., freight train derailed at a crossing, wrecking several cars.

8th, on New York, Lake Erie & Western, near Markham, N. Y., freight train derailed and partially wrecked. One brakeman killed and 1 injured.

9th, on Pittsburgh, Fort Wayne & Chicago, at Canton, O., two cars of a freight train were derailed and ditched, injuring a trainman.

9th, on Pennsylvania, near Christiana, Pa., engine and 18 cars of a freight train derailed.

11th, on Alabama Great Southern, at Birmingham, Ala., switch engine derailed and thrown over an embankment. Two trainmen injured.

13th, on New York Central & Hudson River, at Little Falls, N. Y., 2 cars of a stock train derailed.

17th, on Missouri Pacific, at Centretown, Mo., 5 cars of a freight train were derailed and damaged.

20th, on Atchison, Topeka & Santa Fe, near Tempest, Col., 4 cars of a freight train were derailed and wrecked, killing a number of cattle.

20th, on Hannibal & St. Joseph, near Macon, Mo., freight train derailed. Five oil tank cars exploded and 17 loaded cars and about 100 yards of track were destroyed. One trainman fatally injured.

20th, on Richmond & Danville, near Romancoke, Va., engine, tender and a box car of a mixed train were derailed.

21st, on Missouri, Kansas & Texas, near Temple, Tex., freight train derailed and wrecked. Engineer killed and 2 brakemen injured.

23d, on New York, New Haven & Hartford, near Avon Conn., 13 cars of a freight train derailed, a number of them being badly wrecked. One trainman injured.

25th, on New York, Lake Erie & Western, near Binghamton, N. Y., freight train derailed, damaging several cars, injuring 4 tramps.

29th, on Philadelphia & Reading, at Auburn, Pa., coal train derailed.

29th, on New York & Massachusetts, at Poughkeepsie, N. Y., 7 freight cars broke away from an engine and ran down grade some distance to the tracks of the New York Central, where they derailed, 3 of them being wrecked.

30th, on Kansas City, Wyandotte & Northwestern, at Leavenworth, Kan., engine of passenger train derailed and disabled.

30th, on Texas & Pacific, near Cisco, Tex., freight train derailed, wrecking three cars. Three trainmen injured.

31st, on Missouri, Kansas & Texas, at Circleville, Tex., 5 cars of a stock train derailed and wrecked.

OTHER ACCIDENTS.

3d, on Manhattan Elevated, at Third avenue and Thirty-fourth street, New York City, engine of a passenger train blew out a cylinder head.

10th, on the Philadelphia, Wilmington & Baltimore, near Oakbourn station, Pa., a large tree was blown down upon a passenger train, crushing the tender and forward part of the baggage car.

24th, on Southern Pacific, near Harwood, Tex., engine of passenger train broke a parallel rod.

A summary will be found in another column.

TECHNICAL.

Locomotive Building.

The East Tennessee, Virginia & Georgia has given an order for building 25 locomotives to the Schenectady Locomotive Works.

Car Notes.

The Atlantic Coast Line has given an order to the South Baltimore Car Works for 300 box cars, and to the Tredegar Works, of Richmond, Va., an order for 110 flat cars and 175 box cars.

The Barney & Smith Manufacturing Co., of Dayton, O., this week delivered a number of new passenger cars to the New York Central & Hudson River, part of a large order from that road.

The New York Central & Hudson River has just completed the first of two new funeral cars to be used between New York and Woodlawn cemetery. The car is divided into three compartments. In one end a room is fitted up for the casket; it is finished in mahogany throughout, with a mahogony catafalque upon which the casket rests. Adjoining this is a room designed to afford seclusion to the family and immediate friends of the deceased. The remaining compartment is for the use of the others attending the funeral and is fitted up in drawing-room style. The cost of the car was about $10,000.

Bridge Notes.

The Berlin Iron Bridge Co., of East Berlin, Conn., is erecting an iron bridge for the Somerset road at Caratunk Falls, Me., consisting of three spans, about 150 ft. each. The same company has just completed 23 spans of bridge for the Hartford & Connecticut Western, between Hartford and Canaan, Conn.

The Supervisors of Yolo and Sutter Counties, Cal., have jointly appropriated $10,000 to build an iron and steel bridge at Knights Landing, Cal., across the Sacramento River.

The Hamilton County Commissioners have authorized the County Auditor to advertise for bids for a bridge and viaduct over the canal at Liberty street, Cincinnati, which it is estimated will cost $137,000.

The County Commissioners of Dallas County have advertised for bids to build two new iron bridges across Trinity River, at Dallas, Tex

Two large wooden bridges over Rifle Creek and over Licking Creek, near Alexandria, Ky., were washed away the past week, and will be renewed at once by the town authorities. They will be of iron and steel, each 240 ft. in length.

The County Commissioners of Frederick County, Md., have awarded the following contracts for the building of bridges over the Monocacy River in place of those recently destroyed by the flood: The Liberty turnpike bridge, to the Smith Bridge Co., for $11,200; the Creagerstown bridge, to the King Iron Bridge & Mfg. Co., for $6,870; the Schill bridge, to the Columbia Bridge Co., for $9,600; the Miller bridge, to the Groton Bridge Co., for $4,370; the Georgetown turnpike bridge, to the King Iron Bridge Mfg. Co., for $10,780; the Buckeystown bridge, to the Wrought Iron Bridge Co., for $7,500; the Greenfield Mills bridge, to Messrs. Dean & Westbrook, for $7,100. These do not comprise the entire number destroyed.

Manufacturing and Business.

The Chicago splice bar mill of Morris, Sellers & Co. has started up with the new 600 h. p. steam engine and heavier train of rolls. The introduction and use of heavier sections of steel rails has necessitated the making of much larger splice bars than formerly used. The firm is prepared to roll bars for rails running from 70 to 100 lbs. per yard.

The Johnson Switch Co., whose works were entirely swept away from Woodvale, Pa., in the recent flood, is making preparations to rebuild its plant on an extended scale at Moxham, three miles up the stream. The company employs from 1,000 to 1,200 men.

William Tod & Co., of Youngtown, O., report an unusually large number of rolling mill engines and blast furnace engines as being inquired for at present. The firm is building a blowing engine embodying some new features for the Shenandoah Furnace Co., of Milnes, Va., and has also just shipped a Porter-Hamilton engine to Carnegie Bros. & Co., and is building one for the Lake Erie Iron Co., of Cleveland, O.

The National Boiler Compound Co., of Chicago, has been organized for the manufacture of compounds for the removal and prevention of scale or incrustation in boilers. The capital stock is $50,000, and the incorporators are Peter De Tamble, Edward Hurley and Elbert R. De Tamble.

The Vulcan Iron Works, of Chicago, has just been awarded the contract for the machinery for the Clark street drawbridge.

Lodge, Davis & Co., of Cincinnati, have purchased the entire plant of the Cincinnati Corrugating Iron Co., which they will equip with improved machinery for the manufacture of engine lathes, iron-planers, shapers, upright drills, etc. This will about double their present capacity.

At the recent annual meeting of the Strong Locomotive Co. the following directors were chosen: A. G. Darwin, Malcolm Niven, New Jersey; C. C. Worthington, A. B. Coit, Geo. S. Strong, H. F. Taintor, New York; Geo. D. McCreary and H. G. Morris, Philadelphia; Geo. H. Myers, Bethlehem, Pa. Mr. A. G. Darwin was re-elected President and G. D. McCreary, Vice-President and Treasurer, and Mr. M. Niven was elected Secretary.

The Edison Electric Light Co. is equipping the new steel steamer "General," of the Pennsylvania Company's service, with a dynamo of 150 lights, and a steam plant from the New York Safety Steam Power Co. The company is also furnishing the fixtures, which are very elaborate, and is installing a plant on the new steel boat "Pierpont," of the Brooklyn Union Co., consisting of 100 lights, complete, and an Armington & Sims engine.

The contract for two large duplex gas compressors and boilers for the Kentucky Rock Gas Co. has been placed with the Clayton Air Compressor Works, Dey street, New York. These compressors have a daily capacity of 2,000,000 cubic ft., and are to compress the natural gas at the wells to a pressure of 200 lbs. per square inch and force it a distance of 32 miles to Louisville for light and power purposes. The Clayton air compressors are well adapted for compressing natural gas, and have been very successfully used in several fields.

The following recent orders have been received by the Philadelphia Testing Machine Works of Riehle Brothers, Philadelphia: One 60 ton Riehle self-adjusting railroad track scale for the Thomas Iron Co., Hokendauqua, Pa.; one 50-ton Riehle self-adjusting track scale for C. Midgeley & Co., Etowah, Ala.; one 500-lb. cloth tester for the East Lake Wooleen Co., Bridgeton, N. J.; one 500-lb. wire tester for Blasius & Sons, Philadelphia; one 20,000-lb. testing machine for the Penn. Salt Mfg. Co., Natrona, Pa.; one 5,000-lb. transverse testing machine with transverse indicator for Chattanooga Agricultural Works, Chattanooga, Tenn.; one 1,000-lb United States standard cement testing machine, University of Iowa, Iowa City, Iowa.; one 10-ton wagon scale for Johnson Foundry, Johnstown, Pa.; one 5-ton wagon scale for Carlin & Hass, Chester, Pa.; one 5-ton coal scale for Manz Brewing Co., Philadelphia; two extra heavy furnace charging scales for the Tennessee Coal, Iron & Railroad Co., Chattanooga, Tenn.; one extra heavy furnace charging scales for the Woodstock Iron Co., Anniston, Ala.; one weigh master frame and standard, made to Turkish Standard for Algeria.

Iron and Steel.

The Kingston Locomotive Co. has completed one of the heaviest castings ever turned out in Canada. It is an 18,000 lb. crank for a pump.

The new Eliza Furnace No. 3 of Jones & Laughlin was blown in a few days ago and is now successfully casting 200 tons per day.

The stockholders of the Glasgow Iron Co., of Pottstown, Pa., have voted to increase the capital stock from $300,000 to $500,000.

Stack No. 5, of the Allentown Iron Works, recently produced 630 tons of pig iron, in a 16 ft. furnace, 50 per cent. of which was A No. 1 foundry. This is said to be the biggest production of iron in a week in one furnace ever made in the Lehigh Valley.

The Columbia Iron & Steel Co., of Uniontown, Pa., is adding open-hearth furnaces to its works, and have made two large steam punching machines intended for use on 20-in. beams.

Among recent large orders of the Leechburg Foundry & Machine Co. received is one from the Rolled Steel Carriage Wheel Co., of Pittsburgh, for one 6-in. roll train, one 16-in. roll train and other special machinery; also a large roll order from the Cohoes Rolling Mill Co., of Cohoes, N. Y.

Alex. Laughlin & Co., of Cleveland, builders of regenerative gas furnaces, have sold their patents, drawings, etc., to the Alex. Laughlin Co. (incorporated), who assume entire charge of the business of the firm.

Engine No. 10,000.

The Baldwin Locomotive Works recently completed their ten thousandth locomotive, which was a consolidation engine for the Northern Pacific. The first thousand was com-

pleted in 1861, the second in 1870. the third in 1872, the fourth in 1876 and the fifth in 1880. No. 10,000 weighs 75 tons, 67¼ tons being on the eight 50-in. drivers. The cylinders are 22 by 28. boiler 72 in. diameter. There are 271 2¼ in. flues, and the total heating surface is 2,293 square feet.

One Hundred and Twenty Miles an Hour.

The Electro-Automatic Transit Co., of Baltimore, has been engaged for some time in a series of experiments with the Weems electric railroad system at Laurel, Md. The object in view is the construction of a railroad of 24-in. gauge for the transportation of mails and light packages. There appears to be no peculiarity in the system, excepting that, being on a comparatively small scale, it is believed that electricity can be utilized to advantage for greater distances, where the speed of the motor for certain purposes will more than compensate for its inability to haul heavily loaded trains. It will also be possible to dispatch trains at frequent intervals. The motor car is 18 ft. long and 2½ ft. wide, pointed in front, with an inclined plane so arranged that the air pressure in front will tend to keep the machine on the track at the high speeds at which it is proposed to run. All wheels and appliances are placed within the walls of the car in order to reduce the air resistance to the minimum. The current will be furnished from a station, and generated either by water or steam power. The company is said to own 143 patents in this and other countries, covering among other things a special form of rail, forms of journal adapted to high speeds, and a plan for telescoping the cars of a train in order that an unbroken surface may be presented to the air. The experimental line at Laurel is two miles in length, including 29 changes of grade. Some of the inclines are as steep as 108 ft. to the mile. A speed of two miles per minute is said to have been obtained.

The officers of the company are: Dr. Julian J. Chisolm, President; O. J. Smith, of New York, Vice-President; Alex. Brown, Treasurer; Wm. M. Pegram, Secretary; David G. Weems, General Manager; J. J. Chisolm, Edwd. B. Bruce, B. F. Gambrill, O. J. Smith, Robertson Taylor, Franklin J. Morton, Alex. Brown, S. E. George, Wm. M. Pegram, Edwin F. Abell, David G Weems, Directors.

David G. Weems, of Baltimore, is the inventor of the system. O. J. Smith, the Vice-President, is President of the American Press Association of New York. The officers of the company have made frequent visits to witness the various trials, and with each successful increase of speed made have enlarged their expectations of future results. It remains to be demonstrated, however, whether the system can be operated successfully and economically for long distances, and the claim that these cars will not require a personal attendent for each is certainly open to question. Mr. Weems appears to be a new comer in the electrical field.

The Nicaragua Canal.

The Nicaragua Canal Construction Co. held its annual meeting in Denver, Colo., June 21, and the following directors were chosen: A. C. Cheney, A. O. Cheney, Edward Holbrook, A. F. Hedges, R. A. Lancaster, W. L. Scott, H. C. Taylor, R. Sturgis, J. W. Miller, A. M. Hoyt, J. E. O'Shaugnessy and Daniel G. Jeffers. The work to be done is roughly summed up as follows: A breakwater at Greytown, on the Carribean Sea, dredging thence to the westward ten miles through lagoons, swamps and low ground, then a lock of 31 ft. lift. Two miles beyond there is a second or double lock of the combined lift of 75 ft., then a dam and rock cut of 3 miles, followed by 12 miles of free navigation in the valleys of the San Francisco and Machado rivers, the waters of which will be raised by dams and embankments, the basins connecting directly with the San Juan River above a large dam across the stream which will raise the water in the river and lake, and secure additional free navigation of 64 miles in the river and 56 miles across the lake. On the west of the lake the canal will enter a cut of slight depth in the earth and rock of 8½ miles, issuing into the Tolo basin with 5 miles of free navigation obtained by damming the Rio Grande. At this dam a series of locks lowers the level 85 ft., and the canal proceeds in excavation down the valley of the Rio Grande a distance of 2 miles, to the last rock, a tidal lock of 30 ft. lift, below which the canal enters the upper portion of the harbor of Brito, 1½ miles from the Pacific.

The total cost of building the canal is estimated at $60,000,000. All the preliminary work has been completed and active construction work commenced.

The Iron Ore Trade on the Lakes.

The *Mining Journal*, of Marquette, gives the shipment of iron ore from the Lake Superior mines for this season up to June 19 as 1,838,769 tons, and as a matter of comparison it prints the shipments by ports up to this time for the two past years:

	1889.	1888.
Marquette	397,291	89 161
Escanaba	836,230	491,045
St. Ignace	13,144	35,403
Ashland, Wis.	380,060	167,385
Two Harbors, Minn.	212,018	52,354
	1,838,769	835,348

This increased shipment of 120 per cent. taken in connection with the increased output of our Southern furnaces indicates a strong feeling on the part of our iron producers, and the reported determination of the Minnesota Iron Co. to expend $1,300,000 in ore carrying steamers and barges shows that they expect the present demand to continue.

There is a theory that this ore is being hurried forward so as to be out of the way of any increase of freights from the transportation of grain; freights being now $1.25 from the head of the lake, $1.10 from Marquette and 90 cents from Escanaba, but the *Journal* says that a conservative estimate places the amount of ore now sold at 3,700,000 tons.

It is rumored that the Otis Iron & Steel Co., of Cleveland, is intending to put in a "basic" steel plant. This, if true, will give a market for the non-Bessemer ores of Lake Superior, which so far have found restricted sale, as they were too far from fuel to compete with other non-Bessemer ores. The Otis Co. has just finished a new shop containing thirteen large steam hammers, for axle work.

Consolidation of Car Heating Companies.

The Sewall Car Heating Co., of Portland, Me., and the McElroy Car Heating Co., of Detroit, Mich., have been consolidated as the Consolidated Car Heating Co., and not as the National Car Heating Co., as we announced last week. and which was first adopted. The capital stock is $2,500,000. The railroad companies will be given the choice of using either the Sewall or McElroy system in its entirety, or any combination of the two systems they may desire. By the consolidation of the two companies the ownership of nearly 100 patents, including the applicatons now pending, is given to the Consolidated Car Heating Co. Considerable laboratory work is in progress, but as yet no new devices are far enough advanced to be made public. The company claims that its patents cover much the larger proportion of the features that have met with the favor of the railroad mechanical officers who have decided in favor of steam car-heating systems. The following are the names of the officers of the company: President, Mr. R. C. Pruyn, Albany, N. Y.; Vice-President, Mr. A. S. Hatch, 15 Cortlandt street, New York; Vice-President and Treasurer, Col. William G. Rice, Albany; General Manager, Mr. D. D. Sewall. Mr. J. F. McElroy and Mr. J. E. Sewall will have charge of the mechanical department of the new company.

THE SCRAP HEAP.

Notes.

Three train robbers were sentenced in Arizona last week 25 years each in the penitentiary.

Press dispatches last week stated that the Chinese Government was again active in railroad affairs, and that bids for the construction of a railroad from Pekin to Han Kow would probably soon be invited.

A Rome, Watertown & Ogdensburg car, which had been wrecked on the Canadian Pacific, in Canada, and came home with new trucks, was assessed by the custom-house officers with duty on "imported trucks," although the axles were not new.

The Michigan legislature last week passed a bill reducing passenger fares on the roads of the state to 2, 2½, 3 and 5 cents per mile, according to the gross earnings, but before the bill reached the Governor it was recalled, and is now said to be dead.

Foreign Notes.

A new source of economy has been opened to the railroad companies of England and the Continent of Europe, where the cars are warmed by hot water foot-pans, which, between injuries from being placed in boilers to heat the water, and from knocks received in passing to and from the cars, are often leaky, requiring soldering. One company, instead of selling a lot of old foot-warmers for the customary price of a few pounds, extracted the solder, which weighed over a ton and was worth over £100.

At the Guildhall dinner to the visiting American engineers, Dr. J. Whitemore referred to the nomenclature adopted for new railroad stations in this country, which has, at times, been objected to as crude. He said "that for a long time the corporation he represented built from 400 to 500 miles of railroad annually, and had to name from 50 to 80 stations. At the outset Indian names were selected, but the language contained from 400 to 500 words, many of which were not euphonious; and then, by a mixture of Indian and Greek, new names, such as Minneapolis, were evolved. An Indian dancing-ground was indicated by St. Vitus. When the list of popular saints was exhausted they fell back on modern names like Bright, Gladstone, Bessemer, Tyndall, Huxley, Darwin, Spencer and Victoria."

A concession for a railroad from Jaffa to Jerusalem has been granted by the Sultan to Mr. Joseph Navon, an Ottoman subject, for 71 years. It is stated that a company has been formed in England and France to carry out the scheme, and that the engineers are soon expected to undertake the work.

The conference between Italy and Switzerland upon the proposed Simplon tunnel will be held at Geneva on July 1.

The exhibit of American machinery at the Paris Exhibition is a notably large and complete one. It occupies one-third of the entire space in the big machinery palace, which is nearly 1,400 ft. long, 370 ft. wide and 170 ft. high. There are 500 exhibitors in electrical inventions alone. The Edison exhibit occupies one-half of the entire American frontage, covering 9,000 sq. ft. It is the largest single exhibit in the Exhibition. It is devised to illustrate in miniature most of the practical results of Mr. Edison's inventions. His entire category of inventions, numbering 493, is represented.

"The Intelligent Compositor."

When the typesetter knows no English whatever he can perpetrate bulls compared with which those ordinarily regarded as "funny" are excessively tame. In this line the following specimen of the troubles of a South American road in getting up a circular of instructions will be interesting:

USE OF VACUUM BRAKE.

1 The brake should never le fully oppiico, unless on occasions of emergency, and Drivers must at all times avoid shocks tsudden stoppages.

2 Should a uaggon leave the track erhen running behiud the engine, do not apply the brake fully, lut stop as quickly and as gradualls as possible, without bringing the full weight of train on the waggon off the rails.

3 Care must be taken en using the brake nheuon points y crossing as by applying the brake too suddenly, it is balle to jump the waggons off the track.

4 Jrhen possible appli the trake ni tenie to stop at the desired place evithout useng the full power of brake.

5 Houed these be any leakage in the brake pipes drivers must immediatels report it.

6 Jrhen standing still, shut the steane cock to brake.

JOHN MC. GE!
Chief Engineer.

Sunday Rest.

By discontinuance of Sunday freight trains the Michigan Central has taken off 549 men from service on that day, divided as follows: Forty-eight engineers, 48 firemen, 50 conductors, 100 brakemen, 2 baggagemen, 15 telegraph operators, 71 agents, station men and clerks, 1 train dispatcher, 9 yard masters, 69 switchmen, 34 helpers, 2 switch tenders, 45 yard engineers and 45 firemen, 4 car checkers, 6 roundhouse men. The company operates 1,537 miles of road, and has about 8,000 employés.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

The Supreme Court of Appeals of West Virginia decides that where the road of a railroad company passes into two states, in each of which it is a domestic corporation, and the trustee in a mortgage upon the whole road first brings a suit in one state to foreclose the mortgage, and afterwards brings an ancillary suit in the other state for the same purpose, the plaintiff in said suits cannot object to or prevent a lien creditor of the railroad company, who has not filed his claim in the first suit, from intervening in the second to establish his lien.[1]

The Supreme Court of South Carolina holds that an action to enjoin a railroad company from appropriating land for its road, and for damages for such appropriation, is not an action "for the recovery of real property, or the recovery of the possession thereof."[2]

In Nebraska, the Federal Court rules that where a county's issue of bonds for donation to a railroad has been held void in a court of law, as in excess of the constitutional limit of indebtedness, equity has no power to scale down the issue to the limit, and enforce it against the county, the contract being indivisible, and void *in toto*, and there being no executed consideration to support an implied promise.[3]

In New York, a railroad corporation of Ohio, Indiana, Illinois and Missouri, which had equipped its road under an agreement with a car trust, leased the road and equipment to defendant, a railroad company, which, to induce the car trust to leave the equipment on the road, agreed to pay the balances unpaid by its lessor at certain times, in consideration of which payments the car trust agreed to transfer and assign all its interest to defendant. All the states in which the company was incorporated, except Indiana, provided for the lease of one railroad by another. The laws of Missouri provided that the lease should not be binding until at a meeting of the stockholders, called for that purpose, a majority assented thereto in writing, or until the holders of a majority of the stock assented thereto in writing, and a certificate, signed by the President and Secretary, was filed with the Secretary of State. No meeting was held of defendant's stockholders, but a certificate was filed, signed by the President, who owned nearly all of the stock, and the Secretary, and the road was operated by defendant without any objection from its lessor. The Federal Circuit Court, in an action by the car trust on its agreement with defendant, decrees that the railroad cannot set up that it had no power to make the agreement.[4]

Injuries to Passengers, Employes and Strangers.

A Florida statute prohibits the expulsion of a passenger by a railroad company for non-payment of fare at any point other than a usual stopping place, or near some dwelling house. The Supreme Court of that State rules that when a passenger wantonly violates any other reasonable rule of a railroad company, the obligation to transport him ceases, and the company may expel him from the train at any convenient and safe point that may be selected by the officer in charge, no more force being used than may be necessary for such purpose. This is a common law right, and has not been restricted by statute as in cases of non-payment of fare.[5]

In Florida the Supreme Court lays it down that it is the duty of a railroad company to have a good, substantial and safe track for the use of its trains, and default in that duty, in consequence of which a passenger is injured, is negligence for which the company will be responsible in damages. In a case in which it is shown that after an accident on the road causing injury, it was found that a rail only 10 ft. long was out of place, and the track was very bad, the rails much worn, and were of all lengths, while usually they are 30 ft. long, the verdict of the jury finding negligence should not be disturbed.[6]

In Texas the Supreme Court rules that a railroad, being bound to protect its passengers from the violence and insult of its own servants, is liable for the damages caused by an assault on a passenger by the conductor in charge of the train, though the assault is made willfully and maliciously, and in no manner connected with the discharge of the conductor's duties.[7]

In Pennsylvania a passenger was on a train from F. to C. The night was dark. Just before the train reached W. the conductor announced that passengers for C. would change cars at W. Shortly afterward the train stopped, not at a station, but on a bridge. No announcement was made that the train had not reached the station, and the passenger stepped off in the darkness, and fell through the bridge and was killed. The Supreme Court holds that the question of negligence was properly left to be decided by the jury.[8]

In Florida, the Supreme Court rules that a person traveling on a train which has with it a stock-car carrying horses for him, his duty under his contract being "to feed, water and take care of the horses," is not guilty of contributory negligence from the fact that he was on said car when he was injured, if he was on the car while stopped at a station in the performance of this duty, and had not finished when the train started off, after a stoppage of 15 or 20 minutes, instead of 45, the usual time, and if it is not shown that he had opportunity before the accident to go to any other car.[9]

In Indiana the Supreme Court holds that it is the duty of a railroad company carefully to test and inspect its bridges, and materials used therein, from time to time; and it is not sufficient that such materials are purchased from reputable manufacturers.[10]

In Indiana, where a passenger was injured by a collision between two trains at a crossing, the Supreme Court holds that the fact that he saw the engine of the other train approaching the crossing, and could have signaled defendant's engineer of the approaching danger by pulling the bell-rope in time for him to have stopped the train and avoided the accident, does not relieve the defendant from liability.[11]

The Supreme Court of Georgia rules that one knowingly and needlessly walking at night upon a railroad track can, by the use of ordinary diligence, avoid being run over by a train, unless it appears that owing to some special fact or circumstance the use of such diligence would prove ineffectual.[12]

In Alabama a man was lying drunk outside of a railroad track, at right angles therewith, and with his head between the ends of two ties in a depression, so that an approaching engineer could only see part of the body, and could not tell that it was a human being till he should lift his head. When the train was so near that it could not stop before striking him, he raised his head and was killed. Had he not raised his head he would not have been injured. The Supreme Court holds that the railroad is not liable.[13]

In Supreme Court of Alabama rules that one contracting for the use of a side track impliedly assumes the duty of so using it as to keep it free from obstructions, and is chargeable with any act of negligence of his agents in the performance of their duty in relation thereto, or of the employés of such agents, though he has no immediate control of such employés.[14]

In Missouri a man walked upon the railroad track where he had no right, and knowing that a train was due from behind him, but did not look in that direction, and was struck and killed. The track was properly fenced. The train gave no signal, though the engineer could have seen him at nearly 200 yards distance. The Supreme Court holds that the railroad company is not liable.[15]

In Texas a young girl was walking on the railroad track from school, when she stepped aside for a train until it had passed. The train had separated from some cause, and the rear car of the part attached to the locomotive was some 50 yards in advance of the foremost car in the part of the train following. After the first part of the train had passed, the child went upon the track and was run over by the cars following. As soon as the separation was seen defendant's employés at once applied the brakes to stop the detached part

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[1] Fidelity Insurance Co. v. Shenandoah Valley R. Co., 9 S. E. Rep., 180.
[2] Tompkins v. A. & K. R. Co., 9 S. E. Rep., 521.
[3] Hedges v. Dixon Co., 37 Fed. Rep., 304.
[4] Humph. Myers v. St. L., I. & S. R. Co., 37 Fed., Rep. 307.
[5] South Fla. R. Co. v. Rhoads, 5 South Rep., 633.
[6] Fla. R. & Nav. Co. v. Webster, 5 South. Rep., 714.
[7] Dillingham v. Anthony, 11 S. W. Rep., 139.
[8] Phila., W. & B. R. Co. v. McCormick, 16 Atl. Rep., 848.
[9] Fla. R. & Nav. Co. v. Webster, 5 South. Rep., 714.
[10] L. N. A. & C. R Co. v. Snider, 20 N. E. Rep., 284.
[11] Grand Rapids & I. R. Co. v. Ellison, 20 N. E. Rep., 135.
[12] Wilds v. Brunswick & W. R. Co., 9 S. E. Rep., 595.
[13] Columbus & W. R. Co. v. Wood, 5 South. Rep., 463.
[14] Montgomery Gas Co. v. M. & E. R. Co., 5 South. Rep., 735.
[15] Backer v. H. & St. Joe R. Co., 11 S. W. Rep., 259.

of the train. The Supreme Court holds that the railroad is not liable.[16]

In Missouri a railroad had three tracks crossing the street at right angles. A man was driving on top of a load of wood. There was a defect at the third track, the last one reached by deceased. This track was neither planked nor level with the roadway over a portion or all of the width of the street. In passing over the third track he was thrown off and run over. The Supreme Court holds the railroad liable.[17]

In Indiana the Supreme Court rules that the watchman at a crossing being an employé of the road, it was wholly immaterial as to whether its officers and managers did or did not know of his incompetency.[18]

In Pennsylvania a pedestrian attempted to cross the track at a point much used by the public as a crossing with the railroad's consent, though not a public crossing, where there was nothing to prevent his seeing a train for some distance, if he had looked for it, at a time in the afternoon while it was yet light, and was run over by a train that was being backed rapidly without any signal. The Supreme Court holds that the railroad cannot be held liable, though plaintiff states that he looked each way for a train and saw none.[19]

The Supreme Court of Indiana rules that the fact that one was suffering from Bright's disease when injured does not preclude recovery for the injuries, as, though they were aggravated thereby, the negligence causing the accident is the proximate cause of the injury.[20]

[16] G. H. & S. A. R. Co. v. Chambers, 11 S. W. Rep., 279.
[17] Tetherow v. St. J. & D. M. R. Co., 11 S. W. Rep., 310.
[18] Grand Rapids & I. R. Co. v. Ellison 20 N. E. Rep., 135.
[19] Marland v. P. & L. E. R. Co., 16 Atl. Rep., 624.
[20] L., N. A. & C. R. Co. v. Snider, 20 N. E. Rep., 284.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Bells Gap, 2½ per cent., payable July 1.

Georgia Railroad & Banking Co., 2¾ per cent., payable July 15.

New York Central & Hudson River, quarterly, 1 per cent., payable July 15.

Providence & Worcester, 2½ per cent., and 10 per cent. extra from assets, payable June 29.

Richmond & Danville, 5 per cent., payable July 8.

Richmond & West Point Terminal, semi-annual, 2½ per cent. on preferred stock, payable July 10.

United Railroad of New Jersey & Canal Co., quarterly, 2½ per cent., payable July 10.

Worcester, Nashua & Rochester, 3 per cent., payable July 2.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Campbell Hall Connecting, special, New York City, July 17.

Chicago & West Michigan, special meeting, Muskegon, Mich., July 10.

Duluth, South Shore & Atlantic, annual meeting, July 18.

Hudson Connecting, special, 115 Broadway, New York, July 22.

Marquette, Houghton & Ontonagon, annual meeting, Marquette, Mich., July 18.

Marquette & Western, annual meeting July 8.

Oregon Short Line, special meeting July 17.

Poughkeepsie & Connecticut, special meeting, 115 Broadway, New York, July 22.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Traveling Passenger Agents' Association* will hold its next meeting in Plank's Hotel, Mackinac Island, Mich., July 9.

The *Association of American Railway Accounting Officers* will hold its next meeting at Niagara Falls, N. Y., July 10.

The *National Association of General Baggage Agents* will hold its next meeting at Detroit, Mich., July 17.

The *New England Roadmasters' Association* will hold its next meeting in Boston, Aug. 21.

The *Roadmasters' Association of America* will hold its seventh annual convention at Denver, Colo., Sept. 10.

The *American Association of General Passenger and Ticket Agents* will hold its next semi-annual meeting in Atlanta, Ga., Sept. 17.

The *Master Car and Locomotive Painters' Association* will ahold its next annual convention in Chicago Sept 11.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month, except June, July and August, The next meeting will be held Sept. 11.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Tifft House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds its regular meeting on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in St. Louis on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the house of the Club, 1,122 Gerard street, Philadelphia.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p.m., at its rooms in the Penn Building, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at the Club rooms, No. 24 West Fourth street, Cincinnati, at 8 p. m., on the fourth Thursday of each month.

The *Engineers' Club of Kansas City* meets at Kansas City, Mo., on the first Monday in each month.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p m., on the third Saturday in each month.

The *Civil Engineers' Club of Kansas* holds regular meetings on the first Wednesday in each month at Wichita, Kan.

American Society of Mining Engineers.

The Convention of the Mining Engineers was called together at Denver on the 19th inst., and remained in session there for two days. Papers were read on shaft sinking, the concentration of ores, the Granite Mountain district, the Red Mountain district, and on the ore deposits of Iron Hill, Leadville. Excursions were made to the works of the Omaha & Grant Refining and Smelting Co., the Globe Smelting & Refining Co., and the Boston & Colorado Company's Works at Argo. The party will visit Manitou, Aspen and Leadville.

PERSONAL.

—Mr. William W. Worthington, General Superintendent of the Fort Wayne, Cincinnati & Louisville, has resigned that position, which he has held since 1871.

—Mr. A. N. Molesworth is Acting Chief Engineer of the Charleston, Cincinnati & Chicago, succeeding Col. Thomas E. Matson, who has tendered his resignation.

—Hon. J. A. Chapleau has resigned the position of President and director of the Montreal & Western, and will probably be succeeded by A. Desjardines, M. P.

—Mr. E. E. Willis, who has been Treasurer of the Chicago & Atlantic since November, 1881, has resigned that position, and for the present no successor to him will be appointed.

—Mr. F. W. D. Holbrook, Principal Assistant Engineer of the Seattle, Lake Shore & Eastern, has also been appointed Acting Manager, during the leave of absence of Mr. W. R. Thornell, Manager.

—Mr. Lorenzo Jett, formerly of the Iron Mountain & Helena, and later bridge foreman of the Jeffersonville, Madison & Indianapolis, died at his home at Columbus, Ind., June 21, after a lingering illness of Bright's disease.

—Mr. E. Van Etten, Superintendent of the Buffalo Division of the New York, Lake Erie & Western, has resigned. He has held the position since Nov. 1, 1884, previous to which he was Chief Train Dispatcher of the same division. He has been connected with the road 24 years.

—Mr. Arthur Brown, Superintendent and General Freight and Ticket Agent, etc., of the Bangor & Piscataquis, has just tendered his resignation. Mr. Brown has held the position for thirteen years, and has been Superintendent on the Androscoggin road and Division Superintendent of the Maine Central.

— Col. William G. Rice, who has been Private Secretary to the Governor of New York since February, 1885, and who has been officially connected with the New York State Government since 1875, has resigned his present position to become Vice-President and Treasurer of the new Consolidated Car Heating Co.

— Chicago dispatches state that the consolidation of the Wabash system east of the Mississippi River with the Wabash Western, consequent upon the termination of the receivership of the former, will result in displacing several of the officers, among the rest General Superintendent K. H. Wade. Mr. Wade is an executive officer of marked ability, which is not only evidenced by his services on the Wabash but by the good work he has done in the Time Convention and in other work done by associated roads. His executive ability and the clearness of his judgment as well as his personal worth are well known to all familiar with his work in the lines mentioned. A railroad man of this stamp will not be permitted to remain long unengaged.

ELECTIONS AND APPOINTMENTS.

Atlantic & Pacific.—On and after July the general offices of this company will be located at No. 45 Broadway, New York, instead of 95 Milk street, Boston.

California Central.—At the annual meeting in Los Angeles last week the following officers were elected: William B. Strong, President; J. F. Goddard, Second Vice-President; D. McCool, General Manager; George R. Peck, General Solicitor; H. Silver, Secretary and Treasurer; F. H. Pattee, Assistant Secretary; G. L. Goodwin, Assistant Treasurer; F. T. Perris, Chief Engineer; J. P. Whitehead, Comptroller; J. W. Reinhart, General Auditor. George W. Prescott was appointed Superintendent of Machinery, in place of George Hackney, resigned.

Chesapeake & Ohio.—J. H. Durham has been appointed City Passenger Agent at Louisville, Ky., vice John T. Morris, resigned.

Chicago & Alton.—A. W. Quackenbush has been appointed Superintendent of Machinery to succeed William Wilson, resigned, the appointment to take effect July 1.

Cincinnati, Washington & Baltimore.—At a stockholders' meeting recently held at Cincinnati, the following directors and officers were elected: Directors, E. R. Bacon, New York; Patrick Buchan, London, Eng.; Jay O. Moss, Sandusky, O.; T. Edward Hambleton, Baltimore, Md.; John F. Barnard, Cincinnati, O.; James Esby, Cincinnati, O.; W. T. McClintick, Cincinnati, O.; James D. Lehmer, Cincinnati, O.; Edward W. Strong, Cincinnati, O. Officers: W. T. McClintick, President; E. R. Bacon, Vice-President; C. F. Low, Secretary; William E. Jones, Treasurer.

Chesapeake & Nashville.—H. K. Preston has been appointed General Freight and Passenger Agent and Auditor, with office in Gallatin, Tenn., in place of J. W. Radley, resigned.

Chicago, St. Paul & Kansas City.—W. H. Gowenlock has been appointed Western Passenger Agent, with headquarters at 122 North Third street, St. Joseph, Mo. Jno. H. Green has been appointed Passenger and Ticket Agent at Des Moines, Iowa, with supervision of the passenger business in the State of Iowa, excepting the city of Dubuque.

Circle (Chicago).—The incorporators of this Illinois company are: C. W. Smith, G. A. Parker, H. H. Killgallon, C. M. Gertz, Henry Esdohr, Andrew Deming, William Henry Smith, S. S. Kimball.

Danville & East Tennessee.—The incorporators of this new Virginia company met in Danville, June 19, and elected the following directors: W. T. Sutherlin, John H. Schoolfield, J. F. Rison and J. P. Harrison, of Danville; Thos. Ewing, A. E. Bateman and R. W. Stewart, of New York, and Charles P. Peck, of Portsmouth. The directors will meet July 2 to elect officers.

Denver, Golden & Salt Lake.—The following directors have been elected: G. W. Holdridge, J. G. Taylor, William A. Higgins, D. T. Beans, and H. D. Allee, all of Omaha.

Duluth, Milbank, Huron & Chamberlain.—The following constitute the first board of directors of this Dakota road: D. W. Diggs and Irving Bath, of Milbank; W. H. Lamb and F. M. Snell, of Clark; Charles Reed and John H. Miller, of Huron; L. N. Loomis and Dr. Michter, of Crow Lake; J. M. Greene and J. I. Stearns, of Chamberlain.

Fitchburg.—W. E. Locke having resigned, F. A. Wellington has been appointed to succeed him as General Eastern Agent of the Fitchburg lake and rail freight lines, with office at 250 Washington street, Boston. The foreign freight business of the Lackawanna and Great Eastern Lines, hitherto cared for by Mr. Wellington, will be added to the duties of Mr. Chas. Bradford, General Foreign Freight Agent of the Fitchburg lines, with office at 76 State street, Boston. These changes take effect July 1.

Fort Wayne, Cincinnati & Louisville.—George W. Saul has been appointed General Manager, with headquarters at Fort Wayne, Ind.

Georgia.—Directors were elected as follows, at a meeting held in Atlanta, June 20: C. H. Phinizy, President; C. H. Goodrich, Cashier; Thos. W. Coskeay, H. H. Hickman, Boykin Wright, W. E. McCoy, W. Reese, N. L. Hutchins, Leonard Phinizy, Dr. Calhoun, Judge Hillyer and D. Speer.

Green Bay, Winona & St. Paul.—S. W. Champion has been appointed Superintendent. He will have charge of the operating of the road, with the same authority as heretofore exercised by General Manager G. Campbell.

Indianapolis, Beardstown & Quincy.—The incorporators and first Board of Directors of this Illinois company are: F. B. Stearns and Theodore Weed of New York City, Thomas A. Harris of Kansas City, and R. . Newcombe, Isaac Lesem, John M. Savin, and William W. Gerry, of Quincy.

Kansas City & Beatrice.—Incorporated in Nebraska by Newman Erb, E. Summerfield, C. F. Brotherton, W. P. Dunavant, W. D. Bethel, L. A. Applewhite, Samuel Rinaker. The officers are: W. P. Dunavant, President; E. Summerfield, Treasurer; C. H. Trimble, Secretary.

Long Island.—W. E. Lewis has been appointed Superintendent of Telegraph, with office in Long Island City. He held the same position several years ago, and has been until recently Division Superintendent on a Mexican line.

Louisville, Evansville & St. Louis.—George K. Lowell, late Western Passenger Agent of the company, at Kansas City, Mo., has been appointed Master of Transportation at New Albany, Ind., vice W. S. Marting, resigned.

Louisville & Nashville.—W. S. Martin, Master of Transportation of the Louisville, Evansville & St. Louis road, has resigned, to accept the position of Superintendent of the Birmingham and Decatur divisions of this road.

Meridian, Waterbury & Connecticut River.—F. B. Hurlbut has been appointed Master Car-Builder, with headquarters at Meridian, Conn.

Mexican National.—Theo. D. Kline has been appointed General Superintendent of the entire line, with headquarters, for the present, at Laredo, Texas.

Milbank, Egan & Sioux City.—The following is the board of directors: D. W. Diggs, H. S. Volkmer and Irving Bath, of Milbank; J. H. Eno and Alfred Brown, of Egan; also parties from Brookings, Clear Lake and Sioux City.

New York, Lake Erie & Western.—M. W. Maguire, Trainmaster of the Eastern division of the Baltimore & Ohio has resigned to accept a similar position with the New York Lake Erie & Western, with headquarters at Susquehanna, Pa.

Niagara Falls & Erie.—The directors for the first year are: John King, Samuel M. Felton, Jr., Augustus R. McDonough, E. B. Thomas, Chas. Steele, of New York City, and Edgar Van Etten, Washington Bullard, Henry M. Watson, Henry W. Sprague, John S. O'Shea, W. Irving Babcock, John R. Williams and George F. Brownell, of Buffalo, N. Y.

Northern Pacific.—T. C. Comstock has been chosen Superintendent of the Fargo and Southwestern Division, with office in Fargo, Dak.

Rome & Clinton.—This company, whose road is leased to the New York, Ontario & Western, elected the following directors and officers at the annual meeting held this week: B. J. Beach, W. H. Tuller, Henry Johnson, G. V. Selden, George B. Phelps, D. N. Crouse, J. I. Scollard, F. A. Elliott, J. R. Miller, C. H. Smith, Ellery Stebbins, C. D. Hayes, E. H. Shelley. Officers: President, J. I. Scollard; Vice-President, B. J. Beach; Secretary and Treasurer, C. D. Hayes.

Seattle, Lake Shore & Eastern.—W. R. Thornell, Manager, having received leave of absence, F. W. D. Holbrook has been appointed to take his place as Acting Manager, in addition to his duties as Principal Assistant Engineer.

E. W. Ruff has been appointed General Freight and Passenger Agent, to succeed F. A. Allen, resigned.

Shepang, Litchfield & Northern.—The following have been elected directors: George D. Chapman, Harold Clemens, R. S. Barnes, Elsworth Ives Chapman, Edwin McNeill, Henry W. Buell, Alexander McNeill, Wm. Deming, A. L. Hodge. George D. Chapman was elected President, and Harold Clemens, of New York, Vice-President.

Talladega & Coosa Valley.—The old officers and directors were re-elected at the annual meeting held June 19.

Wabash.—The following appointments under the reorganized company have been announced, taking effect July 1: M. Knight, Freight Traffic Manager; H. L. Magee, General Superintendent, headquarters at St. Louis. He will have charge of Transportation and Maintenance of Way. J. B. Barnes, Superintendent of Motive Power and Machinery, with headquarters at Springfield, Ill.; M. M. Martin, Superintendent of Car Department, Decatur, Ill.

West Florida & Alabama.—Organized by the election of J. D. Pirrong as President; B. F. Howland, Vice-President, and J. H. Hamilton, Secretary.

Wisconsin Central.—S. R. Amslee has been chosen General Manager to succeed W. S. Mellen, resigned, to become General Manager of the Northern Pacific.

G. Campbell, General Manager of the Green Bay, Winona & St. Paul, has been appointed General Superintendent, to succeed A. A. Allen, resigned, to become General Manager of the Chicago & Great Western.

The following appointments have been made: George R. Fitch, General Eastern Agent, with headquarters at New York City; W. W. Scully, Commercial Agent at Pittsburgh, and O. P. Gothlin, General Agent at Cincinnati.

OLD AND NEW ROADS.

Astoria & South Coast.—The grading is now completed on the 10-mile section from Skipanon, W. T., southward, recently let to the Portland Macadamizing & Paving Co. Another section of two miles is now being built. Contracts for 35,000 ties have been let, and the rails and track fastenings will soon be shipped from Chicago.

Atlanta & West Point.—This company uses the track of the Central of Georgia for the first 6½ miles out of Atlanta to East Point, Ga. The grading is now being done, however, for an independent line between these points, as it has been found that the increase of business often causes long and annoying delays to the trains on the present single track line.

Baltimore & Eastern Shore.—Godeffroy & How, of Easton, Md., have the contract for building this road, which is projected to extend from Salisbury to the Eastern Bay in Maryland.

Baltimore & Ohio.—The following table of earnings and expenses for May, 1889, as compared with the month of May, 1888 has been published.

Lines East of the Ohio River.

	1889.	1888.	Inc. or dec.
Earnings	$1,356,160	$1,357,661	D. $1,501
Net earnings	443,835	510,342	D. 66,507

Lines West of the Ohio River.

Earnings	$404,553	411,523	D. $6,970
Net earnings	67,836	52,798	I. 15,038

System East and West of the Ohio River.

Earnings	$1,760,713	$1,769,184	D. $8,471
Expenses	1,249,042	1,206,044	I. 42,998
Net earnings	$511,671	$563,140	D. $51,469

The earnings and expenses for the eight months of the fiscal year 1888-9, compared with the same months of the fiscal 1887-8, were:

Lines East of the Ohio River.

Earnings	$10,201,008	$10,067,499	I. $133,509
Net earnings	3,116,727	3,232,107	D. 115,380

Lines West of the Ohio River.

Earnings	$3,191,570	$3,205,814	D. $14,244
Net earnings	493,542	488,622	I. 4,920

System East and West of the Ohio River.

Earnings	$13,392,578	$13,273,313	I. $119,265
Expenses	9,782,309	9,552,584	I. 229,725
Net earnings	$3,610,269	$3,720,729	D. $110,460

Brantford, Waterloo & Lake Erie.—Nihan, Elliot & Battle, of Brantford, Ont., who have the contract for building the section between Brantford and Waterford, Ont., a distance of 17 miles, now have the grading and bridging practically completed. The rails have been delivered, but as yet no track has been laid on the section.

Burlington & Missouri River.—Contractors on the northwest extension of this road from Alliance, Neb., near the western end of the state, have recommenced work on various portions of the line in Nebraska. It is thought that the company will complete the line to the Wyoming boundary this year.

Canadian Pacific.—Land sales of this company at present are reaching two thousand acres per day. Speculators have been crowding in, and the price has been raised to five dollars per acre, unless to purchasers who show that they intend to settle on and cultivate the land.

Charleston, Cincinnati & Chicago.—McDonald, Shea & Co., of Knoxville, Tenn., who have the contract for building the line from Johnson City, Tenn., to Minneapolis, Va., a distance of about 90 miles, put a force of 500 hands at work last week at Johnson City.

Chicago, Burlington & Quincy.—After July 1 the Keokuk branch, extending from the west end of the Burlington bridge to the city of Keokuk, will be turned over to and be operated by the St. Louis, Keokuk & Northwestern Railway Company; the Carthage branch, extending from the east end of the Burlington bridge to Quincy, will be operated as part of the Illinois system under the officers of the Galesburg division; the lines in Iowa will be operated in two divisions instead of three, as heretofore. The eastern division will extend from Burlington to the western limits of Chariton yards, including the branches diverging from Chariton. The western division will extend from the western limits of Chariton yards to the Missouri River, with all branches diverging west of Chariton. E. A. Stewart, of Burlington, will be Superintendent of the east division. J. H. Duggan, of Creston, will be Superintendent of the west division. The office of W. C. Brown, Superintendent of the Iowa lines, will remain at Burlington. J. B. Maxon, of Ottumwa, Superintendent of the present middle division, will be assigned to other duties.

Chicago, Milwaukee & St. Paul.—The company has sold to Kuhn, Loeb & Co., and Speyer & Co., and Belmont & Co., of New York, $6,000,000 of its new 4 per cent. bonds. These bonds are secured by first lien upon the Evanston Division and its terminals in the city of Chicago, as well as by 178 miles of road hitherto unmortgaged. They are parts of the mortgage for $150,000,000, secured by general lien upon the entire system of the company. It is understood that the present sale will be used as follows: $1,000,000 to take up 7 per cent. bonds due Jan. 1, and the balance for past expenditures, for rolling stock and other improvements. On Jan. 1, 1890, a proposition will be made to other bondholders to retire their securities. It is desired in the meantime to have the $6,000,000 bonds just sold find their standing in the market so as to form a basis for the proposition.

The present debt of the company, in round figures, is $118,600,000 funded and $5,000,000 floating; total, $123,600,000. The funded debt is made up as follows: $3,700,000 bonds at 8 per cent., $1,300,000 bonds at 7.3 per cent., $36,200,000 bonds at 7 per cent., $24,900,000 bonds at 6 per cent., $52,500,000 bonds at 5 per cent.; total, $118,600,000, average at about 6 per cent.

The scheme for refunding is not yet officially promulgated; but it is thought to be like the following: Of the $150,000,000 issue $10,000,000 is to be set aside to provide for the floating debt ($5,000,000) and for such future betterments as may be required. This leaves $140,000,000 or $22,000,000 margin—20 per cent.—for premiums on the present outstanding bonds. Of the outstanding bonds $52,500,000 are 5 per cents, which sell at from 102½ to 109. Of the 7 per cent. and 8 per cent. bonds over $13,000,000 fall due in the next ten years. If the new issue is to be at 4 per cent. the success of the refunding by the issue of $140,000,000 will reduce the company's interest charge over $1,400,000 per annum. The floating debt has borne and now bears interest not less than 4 per cent. The surplus remaining for betterments is to be expended for new values received.

Chicago & West Michigan.—The Chief Engineer will receive bids for clearing, grading and tracklaying on the extension from Baldwin to Traverse City, Mich., a distance of 75 miles. The contracts will be awarded in sections of 25 miles or more. Profiles and specifications can be seen at the office of the Chief Engineer, J. J. McVean, Grand Rapids, Mich.

Circle (Chicago).—This company has been incorporated in Illinois to build a road encircling Chicago, starting from Craigen, in Jefferson, northwest to the County Farm in Normal Park, thence northeast to Forest Glen, southeast along North Branch to Deering Station, Lakeview. The capital stock is $500,000.

Clarksburg, Weston & Midland.—The name of the Clarksburg, Weston & Glenville, extending from Weston to West Clarksburg, W. Va., 25 miles, with a 15-mile branch to Buckhannon, and which is being made standard gauge, has been changed to the Clarksburg, Weston & Midland.

Cornwall & Lebanon.—The directors of the Reading & Lebanon, which was incorporated to build a proposed extension of this road from Lebanon east to Reading, Pa., 28 miles, met in Reading June 21, and formally resolved to abandon the construction and surrender the charter to the state. The organization of the company was the result of a disagreement between the Cornwall & Lebanon and the Philadelphia & Reading over some trackage facilities, connections, etc., which the latter line refused to grant the former. The Cornwall & Lebanon then spent a large amount of money running surveys between Lebanon to Reading, connecting with the Schuylkill Division of the Pennsylvania, and parallelling the Philadelphia & Reading nearly the entire 28 miles. The Philadelphia & Reading and Cornwall & Lebanon roads are understood to have made an agreement this spring which is satisfactory to both roads, and which makes unnecessary the construction of the proposed Reading & Lebanon.

Detroit, Wabash & Chicago.—The survey is now in progress for this road, which has been organized to build a line from Laketon Junction southwest to Wabash, Ind., about 15 miles, to connect the Eel River Division of the Wabash Western with the main line of the Wabash. The idea is to secure a terminus of the former line at Wabash, which township has voted $45,000 to aid the enterprise.

Duluth, Milbank, Huron & Chamberlain.—Organized at Huron, Dak., to build a road from Morris, Minn., on the Northern Pacific, through Milbank, Clark Huron and Alpena to Chamberlain, Dak. The capital stock is to be $3,000,000.

Evansville, Terre Haute & Chicago.—The stockholders met in Terre Haute, Ind., June 20, and the formal transfer of the majority of the stock, recently purchased by the Chicago & Eastern Illinois Co., was made. The road is now practically owned by the Chicago & Eastern Illinois. For several years it has been under a 99 years' lease to that corporation. The road extends from Danville, Ill., to Terre Haute, Ind., 55 miles, and has been leased at an annual rental of $75,000, and interest on income bonds, making the annual rental $81,500.

Gatineau Valley.—This road has been located for 50 miles, and rails for 40 miles of its length have arrived from England. Work has been suspended for a time until some reasonable arrangement can be made with property owners along the proposed line who are demanding exorbitant figures for the right of way.

Grand Trunk Junction.—Articles of consolidation of the Grand Trunk Junction and the Polk & Forty-ninth Streets Junction companies have been filed in the office of the Secretary of State of Illinois. The new corporation will be known as the Grand Trunk Junction Railway, with a capital stock of $1,500,000. The company is to build a connecting line in Chicago from the Grand Trunk Junction road to the Chicago and Western Indiana.

Hutchinson, Oklahoma & Gulf.—J. L. W. Bell, of Emporia, Kan., Morris & Stenson, and Joseph Barrett, of Kansas City, Mo., are said to have been given contracts on this recently incorporated line, and that they are forwarding men and teams to Hutchinson, Kan., and points south of that city. Sleepers and rails are also said to have been ordered and shipped.

Indianapolis, Beardstown & Quincy.—Articles of incorporation of the company have been filed in the office of the Secretary of State of Illinois, with principal office at Quincy. The road is to be constructed from Beardstown, where it will connect with the extension of the Indianapolis, Decatur & Western, through the counties of Brown and Adams to Quincy, Ill., to connect with the St. Louis, Quincy, Omaha & Sioux City, making a new through line east and northeast from these and intermediate points. The capital stock is placed at $2,000,000.

Jacksonville Southeastern.—The road has been ordered placed in the hands of a Receiver by the United States Circuit Court at Hillsboro, Ill., on the ground that the company has refused to pay a judgment obtained against it in November, 1888, for personal injuries sustained by State Senator Southworth in a wreck on the road while he was traveling on his legislator's pass. The company has secured an injunction restraining the execution of the order.

Kansas City & Beatrice.—Charter filed in Nebraska, with a capital stock of $1,000,000, to build a road from a point on the state line in Pawnee County, at or near Summerfield, Marshall County, Kansas, through Pawnee and Gage counties to the city of Beatrice, 36 miles. The line is to be an extension of the Kansas City, Wyandotte & Northwestern. The preliminary survey has already been made, and as stated in our issue of June 14, engineers are now locating the line.

Kansas City, Fort Scott & Memphis.—The company has issued a circular calling attention to the increase of traffic at Memphis, Tenn., and the need of a bridge across the Mississippi River at that point. This road has already formed a company under the name of Kansas City, Memphis Railway & Bridge Co., secured a charter, and started such a structure, which, it is figured, will cost about $2,300,000. To secure this the company now proposes to issue $2,500,000 bonds of the sub-company, with its guarantee.

Kansas City & Pacific.—This road, which extends from Paola, Kan., 43 miles south of Kansas City, Mo., southwest to Coffeyville, Kan., at the Indian Territory boundary line, a distance of 125 miles, has passed into the control of the Missouri, Kansas & Texas and will be used by that road as a part of its Kansas City extension.

Kentucky Midland.—Between Paris and Georgetown, Ky., work has been retarded recently by heavy rains, but 750 men are now being employed, and the force is to be increased to 1,500. The line will probably be completed in September.

Leeds & Gadsden.—Committees are securing right of way for this line, which it is proposed to build from Leeds to Gadsden, Ala., 40 miles.

Lehigh Valley.—The company is said to be purchasing a right of way from Roselle, N. J., through the townships of Union and Clinton to Newark, with the intention of extending its Roselle branch from its present terminus at Roselle to Newark, to give it a more direct line of its own to New York. Connection is now made at Roselle with the Central of New Jersey.

Louisville & Nashville.—This road will let the contract for constructing 23 miles of road up the Powell Valley of Virginia, east from Cumberland Gap, about July 1, and 48 miles more of the same extension to Prince's Flats, to a connection with the Norfolk & Western, about Aug. 1, 1889. Mr. R. E. O'Brien, Engineer in charge, Louisville, Ky., will furnish all information concerning this extension. The company has just let the contract for the graduation, masonry, trestling, etc., for a double track to Winston Bros., of Minneapolis, Minn., as follows: East Louisville to Anchorage, 10.1 miles; South Louisville to Shepherdsville, 15.7 miles. The company will also let the contract for double tracking from Edgefield Junction to East Nashville, 8.6 miles, this week, probably to the same firm. Surveys are also being made for a double track from Boyle to Oxmoor, Ala., 9.7 miles. This is all of the double tracking contemplated at present. The company has begun the erection of a handsome Union passenger station at 10th street and Broadway in Louisville, to be completed in about 12 months.

Louisville, New Orleans & Texas.—The company has let contracts to Bart E. Linehan, of Dubuque, Iowa, to put in a transfer steamer at Helena, Ark.; also, to build all the inclines, cradles, and change of gauge of road from Glendale to Lula. These improvements will necessitate an expenditure of about $300,000.

Milbank, Egan & Sioux City.—This company has been organized to build a road from Milbank, Dak., south near the eastern boundary of the territory to Egan, Moody County, a distance of about 90 miles.

Montreal & Western.—The company is applying for a subsidy from the Dominion Government to aid the extension of the line from St. Therese, Que., where it connects with the Canadian Pacific to the Jesuit settlement at Temiscominque.

Natchez, Jackson & Columbus.—This line is now being changed to standard gauge from Harriston, southwest to Natchez, Miss., 28 miles. The road is now controlled by the Louisville, New Orleans & Texas, and gives that company a line to Natchez, making the connection at Harriston. The Natchez, Jackson & Columbus extends from Natchez to Jackson, 100 miles. At present the standard gauge track will not be extended beyond Harriston, but it will probably soon be completed to Jackson.

New Roads.—The survey is soon to commence for a road from Binghampton, N. Y., to Montrose, Pa., the northern terminus of the Montrose road, a distance of about 20 miles. The route will be through Pierce Creek, Hawleyton, Silver and Quaker Lakes. The expense of the survey will be borne by the Board of Trade of Montrose and Brighton.

New York, Lake Erie & Western.—The earnings and expenses for the month of May and the seven months to May 31, were as follows:

Month of May:	1889.	1888.	Dec.
Gross earnings	$2,182,586	$2,382,878	$200,292
Operating expenses	1,385,805	1,433,733	47,928
	$796,781	$949,145	$152,364
Less proportion due leased lines	185,275	202,922	17,647
Net earnings	$611,506	$746,223	$134,716
Seven months to May 31:			
Gross earnings	$16,849,395	$17,737,470	$888,075
Operating expenses	11,041,364	11,591,784	550,420
	$5,808,031	$6,145,686	$337,655
Less proportions due leased lines	1,501,946	1,555,109	53,163
Net earnings	$4,306,085	$4,590,577	$284,492

Niagara Falls & Erie.—Incorporated in New York to construct a railroad commencing in the Twelfth Ward of the City of Buffalo, at a point in the line of the railroad of the Erie & Black Rock Railroad Co., and terminating at and in the village of Tonawanda, in Erie County. The length of the road is to be 8 miles and the capital stock $100,000.

Norfolk & Western.—Blake Bros. & Co. offer at 93¼ and interest a limited amount of equipment mortgage five per cent. gold bonds, maturing 1908. These bonds are a first lien on equipment, acquired and to be acquired, with the $5,000,000 bonds authorized to be issued. A sinking fund is provided, applicable during first ten years to purchase of equipment mortgage bonds at par or under, and after that time to compulsory drawings by lot.

Northern Pacific.—The company is now connecting its line at Ashland, Wis., on Lake Superior, east of Duluth, with the Northern Division of the Wisconsin Central, which reaches that point.

Ohio Valley.—Last December Christian County, Ky. in which is situated Hopkinsville, voted to aid the proposed Cairo & Tennessee road and the extension of this road from Princeton to Hopkinsville, 30 miles, the sum of $200,000 for each line. The Court of Claims of the county declared both subscriptions invalid, because they were voted on the same day contrary to the statue. An appeal was taken from this decision, but it has been affirmed by the Court of Claims, at Louisville, which declares both subscriptions illegal for the reason given above.

Ontario, Carbondale & Scranton.—At the meeting in New York this week the stockholders of the Hancock & Pennsylvania voted to consolidate with the Forest City & State Line and the Scranton & Forest City roads under this name.

Oregonian.—It is reported that the Southern Pacific has completed negotiations for the purchase of the narrow gauge lines of this company. The lines extend from Dundee Junction to Arlie, or 51 miles, on the west side of Wilamette River, and from Ray's Landing to Coburg, 90 miles, on the east side of the river. The price paid is reported to be $1,500,000, of which a large part is in stock. The company which has owned the lines is a Scotch corporation, the Oregonian Railway Co., Limited. The road was leased to the Oregon Railway & Navigation Co., in October, 1881, but the lease was repudiated in May, 1884, and on Nov. 15 the lessee ceased to operate the road. Litigation to enforce the lease has since ensued in various courts, which was only ended this spring by a decision of the United States Supreme Court in favor of the Oregon Railway & Navigation Co., it being decided that the company had no power to lease its road.

Pennsylvania.—The statement of the business of all lines east of Pittsburgh and Erie for May, 1889, as compared with the same month in 1888, shows an increase in gross earnings of $267,050; in expenses, of $35,178; in net earnings, of $131,872. The five months of 1889, as compared with the same period of 1888, show an increase in gross earnings of $1,295,414; in expenses, of $773,044; in net earnings, of $522,370. All lines west of Pittsburgh and Erie for the five months of 1889 show a deficiency of $200,832, being a decrease as compared with the same period of 1888, of $64,754. It is now estimated that the damage by the flood to all the lines of the system, including the Philadelphia & Erie and the Northern Central, will not exceed from $1,500,000 to $1,750,000. This amount will be entirely supplied from the surplus on hand. The current net revenues of the several companies will therefore not be affected in any way, except by the loss of traffic. The renewal of the bridges destroyed is referred to in another column.

Philadelphia & Reading.—The following is the statement of the earnings and expenses for May, 1889, as compared with the same month of 1888: Gross receipts, $1,617,673, a decrease of $128,967; gross expenses (excluding rent and interest), $957,733, an increase of $87,193; profit in operating, $659,941, a decrease of $216,161; profit from Dec. 1 to date, $3,237,586, a decrease of $157,554, as compared with the corresponding period of the previous year.

Rio Grande Western.—The State Line & Denver, which was recently chartered in Colorado to build from the state line near Grand Junction to Denver, has been formally consolidated with the Rio Grande Western, under which name the Denver & Rio Grande Western has been reorganized, instead of as the Utah & Colorado, which name was first adopted.

Richmond & Allegheny.—In the Chancery Court at Richmond, Va., June 24, certain creditors of the company entered suit against other stockholders of the company to recover of the defendants, who are or were stockholders of the Richmond & Allegheny, their pro rata shares of $4,940,000, the difference between the $5,000,000 stock subscribed and the $60,000 actually paid in, as shown by the statement of the Secretary.

Rochester & Glen Haven.—The road was opened to Irondequoit Bay, a summer resort five miles from Rochester, N. Y., where the road begins. The company has had erected at the bay a hotel, wharves, piers, etc., and made many other extensive improvements.

Rockaway Valley.—The extension from New Germantown to Fortersville, N. J., four miles, is now graded north for two miles to a place called "Oklahoma." Rails are arriving and tracklaying will soon begin. Right of way has been secured to Peapack, and the extension to that point will be built this fall.

St. Louis, Arkansas & Texas.—A. H. Swanson, General Transportation Manager of the Houston & Texas Central, has been appointed joint Receiver with Col. S. W. Fordayce, for that part of the company's lines which lie in Texas. The appointment was made on the application of New York creditors before the United States Circuit Court at New Orleans.

San Antonio & Aransas Pass.—It is stated that the company has concluded negotiations with the Southern Pacific, by which it will run the trains of its Houston extension to the depot in Houston over the tracks of the Southern Pacific. An arrangement has been made with the Gulf, Colorado & Sante Fe, by which that company was to give the San Antonio & Aransas Pass terminal facilities in the city, but the agreement was rescinded at the last moment.

Sonora, Sinaloa & Chihuahua.—Press dispatches the past week have announced that President Stephen G. Clarke, of 1,525 North Halstead street, Chicago, has let to Huse & Co. a contract for building this line from Deming, N. M., to Casas Grane, Mex., a distance of 145 miles.

Toledo, Ann Arbor & North Michigan.—The road has been extended this year to Sherman, Wexford County, Mich., 10 miles from the former terminus at Harriette, in the same county. The line is under contract to Weldon, Benzie County, 22 miles northwest of Sherman. The contractors are Wallace & Dingman, Charles Warner and W. Pickard.

Union & Northwestern.—The survey for this road has just been completed to Farmersville, La., from Monroe, about 27 miles. The survey is to be continued northwest to Camden, Ark., 85 miles, from Farmersville. A line from Monroe east to Vidalia, La., opposite Vicksburg, Miss., 75 miles, is also projected, making the total length of proposed line 187 miles. The country is thickly settled and heavily timbered with pine, oak and walnut. C. G. Woodbridge, of Monroe, is chief engineer, and John R. Richardson is in charge of the engineer corps now in the field.

Union Pacific.—The statement for April of the entire system, and including lines in which the company has half interest, shows: Gross earnings, $2,763,709; decrease from the month last year, $446,020; net earnings, $895,054; decrease, $376,030. For four months ending April 30: Gross earnings, $10,259,945; decrease, $964,209; net earnings, $2,865,373; decrease, $991,603.

Wabash.—An order has been entered in the United States Circuit Court, Indianapolis, directing the Receiver of the Wabash to turn over to the Committee of Purchasers under the foreclosure the road and its belongings in Ohio, Indiana and Illinois, and to close out the receivership as soon as possible. The Wabash Western will take control July 1, as Agents of the Purchasing Committee, but the formal consolidation will not take place until some time in August, as the meeting for the reorganization does not take place until July 29.

Weatherford, Mineral Wells & Northwestern.—About $25,000 has been subscribed in Weatherford, Potter County, Tex., to aid this road in building northwest from Weatherford to Mineral Wells, in Palo Alto County, and thence northwest. The route is said to be through coal lands. The right of way through Palo Alto and other counties has been nearly all secured for the company. It is expected that the survey will soon commence.

Wilkesbarre & Western.—The company is reported pushing the work on the extension from Watsontown to Shickshinny. From Watsontown to Millville, a distance of 21 miles, the road has been completed, and trains are now running on it. To Millville to Rohrsburg, a distance of 10 miles, the line has been graded, and the rails are now being laid; it is expected to have this part of the road completed by July 13. The remainder of the section from Rohrsburg to Shickshinny will be more tedious, as more grading and blasting will be necessary on account of the mountains, but the road will probably be in operation to Shickshinny before the end of the year.

TRAFFIC.

Traffic Notes.

The first car load of watermelons from Georgia via the East Tennessee, Virginia & Georgia, this year, was taken from Jesup, Ga., to Chicago in 72 hours, the distance being about 1,240 miles.

The roads of the Western Freight Association are watching each other so closely that they have now passed a resolution forbidding the securing of business by means of paying for customer's telegrams.

Lake rates on grain from Chicago to Buffalo are steady and firm, corn being taken at two cents a bushel. Rates on coal from Toledo to Duluth are 50 cents and from Buffalo to Chicago 60 cents per ton.

Rates on iron from Cleveland to the Atlantic seaboard have been reduced about 20 per cent. on pig in carloads, and a little more than that on small lots and other kinds, to equalize the tariff with rates from Youngstown and other points south of Cleveland.

The St. Joseph & Grand Island, having applied to the Executive Board of the Inter-state Commerce Railway Association for leave to compete with the Freemont, Elkhorn & Missouri Valley in rates on grain from points in Nebraska to St. Paul, the board refuses to grant the permission, taking the ground that the route via St. Joseph is unreasonably circuitous.

Chairman Blanchard has issued a call for the third quarterly passenger rate meeting to be held at Chicago, July 1. The plan of revising these sheets only once in three months has been quite successful, and Mr. Blanchard in urging compilers and rate clerks to be present and remain until the work is completed, states that it will be impossible to make changes in the sheets after this meeting until the regular revision for the issue of Nov. 1.

The Chicago & Alton having complained to the Western States Passenger Association (from which association it has not withdrawn) that tickets of the Rock Island were in the hands of scalpers at Denver and that rates were being cut, Chairman Abbott has considered the case and refuses permission to reduce the passenger rate from Chicago to Denver. He says that there is not sufficient evidence to support the charge that the tickets of rival lines are being handled by scalpers in such a way as to cut the rate, and that the situation does not warrant a reduction. The Alton refuses to abide by this decision, and announces that the first-class limited rate, which is now $30.65 between Chicago and Denver, will be reduced to $26, taking effect July 1. The other Denver lines will no doubt follow suit.

The Inter-state Commerce Commission.

FREE CARTAGE.

The Commission on June 21 sent a circular to all railroads requesting them to furnish certain information on these questions: At what stations, if any, on your line or lines, do you make free cartage delivery of any or what class of freights? Are these stations, or any of them, stations which are grouped with any other station or stations on your line or lines, and at which the same transportation rates are charged as to any of such freights so delivered by free cartage? How long has this system of free cartage delivery of such freights been in use by your company? What is its origin, and state all the facts, circumstances and conditions, if any, that have induced it to be done? Has it resulted in your competitors making free cartage delivery at the same stations or not? What effect, if any, has it had upon rates at these stations as compared with rates at other stations on your line or lines? Do your rate sheets or tariffs make any, and what, reference to free cartage where it exists? What estimate do you make of the actual cost of such free cartage to you at each of said stations where it is done by your company?

A THROUGH RATE NEED NOT BE THE SUM OF LOCAL RATES.

The following letter from Judge Cooley was received by Chairman Blanchard, of the Central Traffic Association, last week. The recent decision of a case in the United States Court in Missouri, by which the *amount* of allowable difference between a through rate and two local rates combined (over the same route), was virtually left to be dicided by a jury, has excited much comment and discussion, and the letter may apparently be regarded as in the nature of a commentary on that decision. The letter is as follows:

Some time since you proposed to the Commission a question which you stated as follows: "May a railroad company make a tariff which shall show and be only its proportion to be charged to a given point on traffic to further points, the rates in such proportional tariff being less than the local tariff of the same company to the same points?" The commission has repeatedly held that it is not necessary that the proportion a railroad shall consent to receive of a through rate should be the same as its local rate for transportation over an identical line. It is fully impressed that the proper transaction of the business of the country compels the acceptance in a great many cases, and perhaps generally of a less sum as the proportion of a through rate than is charged as a local rate, and that any ruling that the two must be identically the same would be as unfortunate to the commercial interests of the country as it would be to the railroads themselves.

You are right in saying that the proposed arrangement accomplishes precisely the same purpose as the making of a through rate, and that it saves to the carriers cost and labor, which would otherwise be needlessly expended, but the Commission does not see its way clear to a ruling that this can be done under the law.

You mention the fact that the commission has decided that a rate may be made by the addition of the locals. This, we think, is very clear, but in that case there is no reducing of the local to form a through rate not agreed upon as such in advance.

Major J. P. Sander, of the U. S. Army, in traveling with his family from San Francisco to Fort Leavenworth, over the Southern and Union Pacific roads, misapprehended the statements of the ticket agent at San Francisco, and bought tickets only to Ogden, when to get the lowest rate he should have bought them through. He complained to the Commission, which finds that the railroad agent acted in good faith, and with no intention to defraud or mislead. The road may lawfully return the excess, and the companies are recommended to restore to the complainant the amount paid above the through fare.

William L. Lawson, who claims to have been overcharged on lumber from Southern points to New York City, in entering complaint against the Newport News & Mississippi Valley and the Baltimore & Ohio, includes the New York lighterage agents as defendants. His special grievance is that the lighterage charge of 5 cents per 100 lbs., was not made known to him at the time of shipment; neither was it in the published tariffs.

Inter-state Commerce Railway Association.

The decision concerning rates on bullion from Utah and Colorado points to the Missouri River, which was issued June 6 by the special board of arbitration, consisting of Messrs. Walker, Midgeley and W. W. Finley, was unaccompanied by any elaborate discussion of the subject, the board simply stating that for sufficient reasons the rate from Utah would be reduced from $15 to $13 per ton, and that the existing rate of $7 per ton from Colorado points remained unchanged. The board has now issued a circular givings its reasons. Bullion goes from Utah to California and to New York via California and Cape Horn. Utah smelters claimed that the reduction was essential to their remaining in business. The Colorado smelters are not on a direct through line from Utah, and thus a rate of $15 from Leadville as against one of $13 from Utah does not violate the Inter-state Commerce law. It appears to the Commissioners that the rate from Denver and Pueblo to the Missouri River has little relation to the Utah rate. The rate from Denver and Pueblo to the Missouri River is unaffected by other rates except that on ores originating on the same territory. The existing rates on ore and bullion have been fair to smelters both at Denver and in the East. The reduction in these last-named rates was demanded by the Rock Island, which first competed for Denver business in the latter part of 1888, but the present rate is not unreasonably high, in fact is too low, and the reduction of $1 would not correct the existing disparity in Leadville rates. Hence the reduction is not authorized. The decision goes on:

There is a broader consideration, however, which is of itself controlling. It is an almost universally conceded fact that the earnings of the associated roads of late quite generally have fallen short of a fair measure of compensation to the capital invested in them. Reasonable and stable rates, which this association is expected to establish and maintain, must be protected all along the line, or they cannot be protected at all. Whenever, as in the case of the Utah smelters, substantial reasons exist for reducing a rate, this organization should not hesitate at once to make the reduction; and in like manner if it appeared that adequate measures for an advance exist it ought to be equally prompt to enforce them. In the present case no advance is now proposed, but upon a consideration of the general situation of the railroad system of the western states and territories the Executive Board feels bound to oppose what it believes to be an unnecessary and uncalled for reduction.

Attention has recently been generally attracted to certain litigation in Missouri, which brings to light a series of possibilities under the Inter-state Commerce law, that have not heretofore attracted the attention which they have apparently deserved. There is little difficulty in so shaping causes that a variety of questions may be submitted to the verdict of a jury. In view of the existing statutes of the United States and of the several states, it is obvious that the great aim of the carriers should be to establish and maintain a system of rates not open to attack. If the tariffs and classifications are in fact just and reasonable, equal and well balanced, there is little likelihood that suits will be brought.

The difficulty will always be found in the standards of comparison which are erected by the carriers themselves. The adjustments required by the new order of things are gradually effecting a revolution. It is of little use to inquire whether it is or is not best for the greatest number that tariffs should be framed upon principles of mutual relation to each other, or should be established arbitrarily under the requirements of competitive conditions. The law with its general principles is now in operation, and the policy of the carriers must be shaped accordingly.

Carriers should protect themselves by removing so far and so fast as possible all apparent disparities in their rates, and should do this at once in order to anticipate and prevent litigation. They can preserve revenues adequate to the requirements of the service by general readjustments under which competitive rates are advanced, while local rates may possibly be reduced. Local points have assumed a new importance. The stimulation and encouragement of local traffic is a necessity. It will grow when it is fertilized. Competitive traffic for which the roads have struggled in the past by reducing rates to the lowest margin of profit was of very little value when so obtained, and is worse than useless now that it is made the measure of intermediate charges, or of tariffs for similar distances upon other lines. A low through rate or a rate by a circuitous route has become practically a yardstick.

The reflex influence of unbalanced tariffs throughout the railroad system has been too generally overlooked. The effort to preserve a participation in certain traffic by the offer of low rates is likely to very seriously affect all tariffs upon each line that makes the reduction, and upon other lines also.

The rate in question, in which five important roads participate, forms part of a long through rate to a distant market. It does not seem to work injury to shippers. It is not controlled by any competition that has been brought to the attention of the board. None of the usual reasons which at times compel a reduction of the tariff are found to exist. Yet a reduction of this rate, although of comparatively little consequence in itself, might be far reaching in its results. It would be a step in the direction of establishing a measuring rod for rates upon other commodities, and upon lines of road between other points. Carriers should hesitate long before they enter the path proposed; before a reduction is made in a long distance tariff under the present situation of the matter of legislative control, the reasons, therefore, should be plain and convincing.

The Rock Island subsequently asked for a division of the bullion traffic, and a hearing on this demand was appointed to be held in Chicago this week, but it is now said that all further action will, by agreement, be suspended.

Northwestern Rates.

On June 20 the Lake Superior lake lines announced a reduction in lake and canal rates between the Atlantic seaboard and St. Paul to the basis of 36 cents first class, 2 cents lower than the rates then existing.

The all-rail rates via Sault Ste. Marie between the seaboard and St. Paul were reduced on June 20 to a basis of 75 cents first class, and on June 22 a further reduction to 60 cents was announced. This, however, was only via the Canadian Pacific.

At a meeting in Chicago on the 21st the roads between that city and St. Paul decided to abolish the tariffs by which they accepted as their proportion on through shipments from the seaboard to St. Paul, 38 cents per 100 lbs. (or less), and to restore the old tariffs on July 5. Reports are somewhat conflicting, but it appears that on carload lots of heavy commodities low rates will still be kept in force.

The National *Dispatch* has announced rates from the seaboard to St. Paul on the basis of 51 cents first class, rail and lake.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending June 22 amounted to 39,365 tons, against 39,156 tons during the preceding week, an increase of 209 tons, and against 37,434 tons during the corresponding week of 1888, an increase of 1,931 tons. The proportions carried by each road were:

	W'k to June 22.		W'k to June 15.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	5,084	12.9	4,849	12.4
Wabash	4,189	10.7	4,670	11.9
Lake Shore & Michigan South.	7,213	18.4	7,044	18.0
Pitts., Ft. Wayne & Chicago	4,452	11.3	3,846	9.8
Chicago, St. Louis & Pitts.	3,516	9.0	2,610	6.7
Baltimore & Ohio	3,141	8.0	3,505	9.0
Chicago & Grand Trunk	6,142	15.6	6,069	15.5
New York, Chic. & St. Louis	2,537	6.5	2,624	6.7
Chicago & Atlantic	3,091	7.6	3,945	10.0
Total	39,365	100.0	39,156	100.0

Of the above shipments 2,287 tons were flour, 7,229 tons grain, 1,971 tons millstuff, 3,147 tons cured meats, 1,731 tons lard, 8,597 tons dressed beef, 195 tons grass seed, 2,748 tons butter, 1,517 tons hides, 607 tons wool, and 5,181 tons lumber. The three Vanderbilt lines together carried 37.8 per cent., while the two Pennsylvania lines carried 20.3 per cent.